Analyser Control for Windows for Networks

Operating Manual

PROCAL

Procal Analytics Limited

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1 Introduction

Welcome to the *Analyser Control for Windows for Networks (ACWn)* Operating Manual. This introductory section is intended to give you an overview of both the system and this *Operating Manual*. If you are new to *ACWn*, we recommend that you should read through this section before you start to use your system.

The following topics are covered in this section of the manual:

- About the Procal Analyser range.
- About *Analyser Control for Windows for Networks*.
- About this user manual.
- The user interface.
- Further help and support.

About the Procal Analyser range

The Procal Analyser range of high-performance gas process analyser systems ~~is~~ intended to be used for Continuous Emission Monitoring (CEM) and measuring gas concentrations in continuous industrial processes. This is described in the Procal short form catalogue and in individual data sheets.

About *Analyser Control for Windows for Networks*

Procal's range of gas analysers is provided with a serial data port from which measured data may be transmitted. *Analyser Control for Windows for Networks* takes this raw data, and presents it in a Windows graphical user interface and allows for the storage of that data for up to 5 years.

Analyser Control for Windows for Networks is a stand-alone program that provides all the display requirements of a Procal Analyser system, including the incorporation of third party data. It also allows remote monitoring of systems over a network.

About this user manual

This user manual describes the *Analyser Control for Windows for Networks* program. A separate manual exists for each of the different PROCAL optical head units.

Document conventions

The information in this manual is presented in a consistent manner to make it easy to follow. A number of conventions are used to ensure that items referred to regularly can be recognised easily.

Keyboard keys

The keys on your computer keyboard may not be labelled exactly as they are represented in this manual. Keys other than alphanumeric are represented in upper case throughout the manual, for example CTRL to represent the control key and ESC for the escape key.

Certain operations require the use of combinations of keys. If two keys are to be pressed together, a plus sign (+) appears between them. For example CTRL + F1 means hold down the control key while pressing F1. Alternatively, a sequence of key presses will be separated by commas. ALT, C, F means press and release ALT then C then F in that order.

Text entry

Text that you need to type in is shown throughout this manual in bold. For example, if an instruction says type **win a:\setup**, you should type **win** followed by a space then **a:\setup**.

Cross reference

References to other sections of the manual and external documents are presented in italics. Groups of words in *italics* are usually cross-referring the reader to a section or sub-section by name.

Procedures

A number of procedures are described within this manual, each consisting of a set of individual numbered operations. The operations must be performed in the order in which they are listed.

Some procedures do not have numbered steps. In these cases, the options may be alternatives or the steps to be followed may not be in a strict order.

The user interface

Analyser Control for Windows for Networks has been designed to use the standard Microsoft Windows user interface wherever possible. You should ensure that you are familiar with the Windows environment before you start to use *Analyser Control for Windows for Networks*. If you need more information about the interface, refer to the documentation supplied with Windows.

Full details of the features contained in *Analyser Control for Windows for Networks* and their implementation within Windows are given in the section entitled *Using Analyser Control for Windows for Networks*.

Further help and support

This *User Manual* aims to give you all the information you require to install and operate *Analyser Control for Windows for Networks*. If you require any further information regarding the product, you should contact Procal Analytics Ltd, or your Procal distributor.

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2 Installing the program

This section describes how to install *Analyser Control for Windows for Networks (ACWn)* so that you can begin to monitor and record data.

The following topics are covered in this section of the manual:

- System requirements.
- Unpacking *ACWn*.
- Connecting the PROCAL heads.
- Installing the software.
- About the pre-set configuration.

System requirements

Procal Analytics Ltd. strongly recommends that *Analyser Control for Windows for Networks* should be installed on a dedicated IBM PC-compatible computer which must conform to the following *minimum* specification:

- PC with 1 Gigahertz or higher processor clock speed recommended; 32bit or compatible 64bit processor; * Intel Pentium/Celeron/Core 2 Duo family, or AMD Athlon/Sempron (64) family, or compatible processor recommended
- 1 Gigabytes (GB) of RAM or higher recommended (512 MB minimum supported; may limit performance and some features)
- 40 gigabytes (GB) of available hard disk space. Additional hard disk space may be required if you are monitoring more instruments.
- Super VGA (1024 × 768) or higher-resolution video adapter.
- CDR-W drive.
- Keyboard and Microsoft Mouse or compatible pointing device.
- LAN Interface and/or dial-up modem.
- Two USB ports or more recommended (one USB port minimum).
- Minimum of two RS232 serial ports.
- Operating System Microsoft® Windows XP PRO SP2/SP3 or Windows 2000 SP4..
- 17-inch CRT/LCD (1024x768) monitor minimum.
- Colour A4 printer.

Note
Actual requirements will vary with your system configuration and any additional applications you install and run.

Unpacking *ACWn*

Analyser Control for Windows for Networks is supplied compressed onto a CD-ROM. A setup program, contained on the CD-ROM, will automatically decompress these files and copy them onto your hard disk.

When you first unpack *ACWn*, you should make sure that the following are present:

- An *ACWn* installation CD-ROM containing the *ACWn* program files.
- The *Analyser Control for Windows for Networks User Manual* (this document).

Connecting the PROCAL Analyser Units

To connect the PROCAL analyser units, please refer to the operating manuals supplied with each head.

Connection is made from the PC on which *ACWn* is running to the analyser units using a multi-drop RS485 network as illustrated in the drawing 7-2103 included in the Installation Pack.. Procal Analytics Ltd. recommend that the analysers should be connected to the PC using the specified isolated RS485 unit. If you intend to connect the analyser units using a different unit, please refer to the documentation that was supplied with the unit.

Installing *ACWn* software

For systems meeting the full recommended specification, you should install *ACWn* from the supplied CD-ROM. If you need to install onto a system without a CD-ROM drive, use the procedure *Setup From HDD.exe*.

The *ACWn* installation CD contains an automatic setup utility that will guide you through the installation. If this utility does not start select **X:\Install\auto-g.exe** (where **X** is your CD-ROM drive letter). If you wish to manually install *ACWn*, execute the install bat file on the root of the CD.

Note
We strongly recommend that you install *ACWn* to the default directory.

Follow the instructions in the setup utility to install the software from CD.

Note
You do not need to uninstall any previous versions of *ACWn* before installing. If *ACWn* has not previously been installed on this PC, you will need to follow the instructions in. If the machine is to be a master you will also need to extract the configuration database from existing systems. A configuration database is not required for remote PCs.

A new Program Group will be created entitled ***ACWn***.

WE RECOMMENDED THAT A SHORTCUT TO THE PROGRAM *ACWN*.EXE SHOULD BE PLACED IN THE WINDOWS STARTUP FOLDER SO THAT THE PROGRAM AUTO STARTS AT POWER ON.

The software is now ready for use.

Setup From HDD.exe

If you need to install *ACWn* onto a PC without a CD-ROM drive:

1 Download the **ACWN Setup from HDD.exe** (available from the CD-ROM **X:/extra/ACWN Setup from HDD.exe**, where **X** is your CD-ROM drive) to the PC desktop using ftp/LAN.

2 Double-click **ACWN Setup From HDD.exe** to extract it.

3 Select **Install** to extract the files to Desktop.

4 Execute the **setup.bat** file in the folder labelled **ACWN117HDD** on the Desktop.

Note
We strongly recommend that you install *ACWn* to the default directory.

Installing Firebird

If you are installing on a PC that has never had ACWN installed, you will also need to install Firebird for ACWN to operate for both the master machine and remote machine. To install Firebird:

1 Place the *ACWn* CD in your PC CD-ROM drive. The auto-load feature will display a selection screen.

2 Select the Install Firebird button.

3 Follow the instructions within the wizard to install Firebird.

Extracting the configuration database

For a new master PC, you will need to extract the configuration database from existing systems. A configuration database is **not** required for remote PCs. The procedure has two components:

- Backing up the system database.
- Installing the new system database.

Backing up the system database

When installing a new database we recommend that you should make a back up of the current database. To back up the database.

1 Select the **Overview** screen.

2 Select the **System Number** (which is to be backed-up) from the branch structure on the left hand side of the **Overview** screen.

3 Select the **System Status** menu from the menu screen options on the right hand side of the **Overview** screen.

4 Connect to the database by selecting the **Connection Status - Connect** button. Connecting to the database will cause the Access level menu to appear at the top of the **Overview** screen.

5 Select the **Access Level** menu and enter the appropriate password to change the **Access Level** to **Engineer**.

6 Click the **OK** button.

7 Select the **Tools** pull down menu from the top of the **Overview** screen and select the **Backup/Restore** option. The **Backup/Restore configuration** message box will be displayed.

8 Enter a name for the back up data base or use the DEFAULT name. Click the **Back Up** button. An information message box will appear – **System configuration back up OK**.

9 Click the **OK** button and then the **Close** button.

10 If the above message is displayed the database has been successfully backed up. The location of the back-up database file has the following directory path and can be accessed via the Windows Explorer facility:

C:\Program Files\ Procal\ ACWN\DbM\Configuration

The database File has a GDB extension and includes within the file the Beta Vectors for all the P5000 Analysers present on the System backed up. To the database name is added the current date and time together with the system 88------ number.

The size of the file depends on the number of heads within the system and maybe too large to fit on a normal floppy disk. The file can be zipped up if required.

11 The database should be stored on an appropriate archive facility.

Installing the new system database

To install the new database:

1 Insert the floppy disk with the system data base into the PC.

2 Copy the database (which may be in the form of a zipped file) to the Windows\Temp directory.

3 The database file will normally be stored as a zipped file on the floppy disk and must be unzipped using Winzip or a similar program.

4 Select the **Overview** screen and select the **Disconnect** button next to the **Connection Status** option to disconnect from the current system database.

5 Copy the unzipped database from the C:\Windows\Temp directory into the directory:

C:\Program Files\ Procal\ ACWN\DbM\Configuration

and overwrite the current database.

6 The new database will not be implemented until the system is re-connected. Select the **Overview** screen and click on the **Connect** button next to the **Connection Status** option to connect to the new system database. Select the **Start** button next to the **System Status** to start the system using the new database.

Pre-set configuration

Before shipping, *ACWn* has been pre-set with your Analyser system configuration requirements. To minimise accidental changes to the configuration settings they have been protected by password.

There are three levels of access to *ACWn*:

- **Operator** — This is the default access level. General day-to-day functions can be performed by users at this level.
- **Supervisor** — This is a higher access level reserved for supervisor use. Operating *ACWn* at this level gives the user the facilities to alter some operational features of the *ACWn* configuration.
- **Engineer** — This access level is reserved for use **only** by Procal engineers or their representatives. It allows full access to the configuration of *ACWn*.

If the access level you are currently working in does not allow you access to a particular function, it will appear as a 'greyed out' menu option. If you are viewing configuration data, any data that your access level is not allowed to alter will be displayed in grey text.

Uninstalling *ACWn*

To remove *ACWn* from your machine, run **Add/Remove Programs** from the Control Panel, select ***ACWn***, and click **Add/Remove**. Select the **Remove All** button.

3 Using the program

This section describes how *Analyser Control for Windows for Networks (ACWn)* is used. Topics included are:

- Starting *ACWn*.
- Changing the language.
- Setting up ACWn for the first time.
- Configuring *ACWn* to start automatically.
- Changing the access level.
- Using the program features.
- International settings.
- Backing up data.
- Exception log.
- Closing *ACWn*.

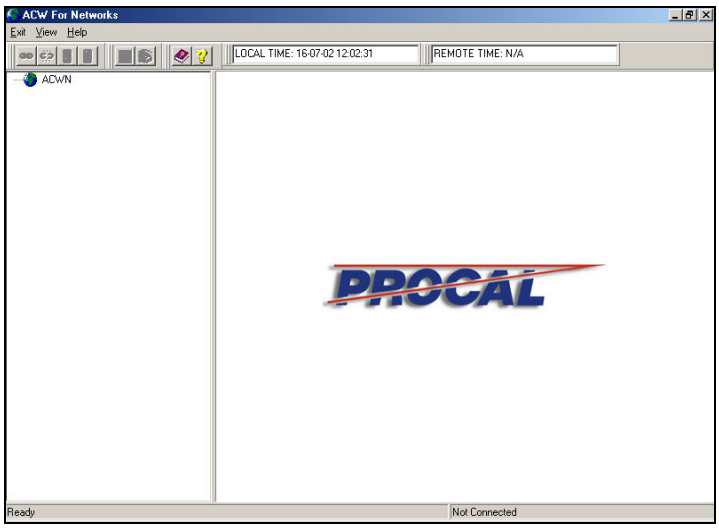
Starting *ACWn*

If the program has not been configured to auto start in the Windows ***Startup*** folder:

1 Open the Windows **Start** menu.

2 Click **Programs**.

3 Click ***ACWn*** then again ***ACWn***. After system files have been loaded, the **Overview** window will be displayed:



Note
Whenever *ACWn* is started, it will automatically open up in **Operator** access level.

Changing the language

With the use of ACWn in a country other than the UK a modified version of the program can be obtained. This version will have the option to change the core language used throughout the program.

To change the language

1 Firstly select **Language** from the **Tools** menu. This will bring up a window with a pull down menu of languages available:

2 Select the language required from the list and press the **OK** button.

3 The program will now translate all text into the chosen language.

Setting up ACWn for the first time.

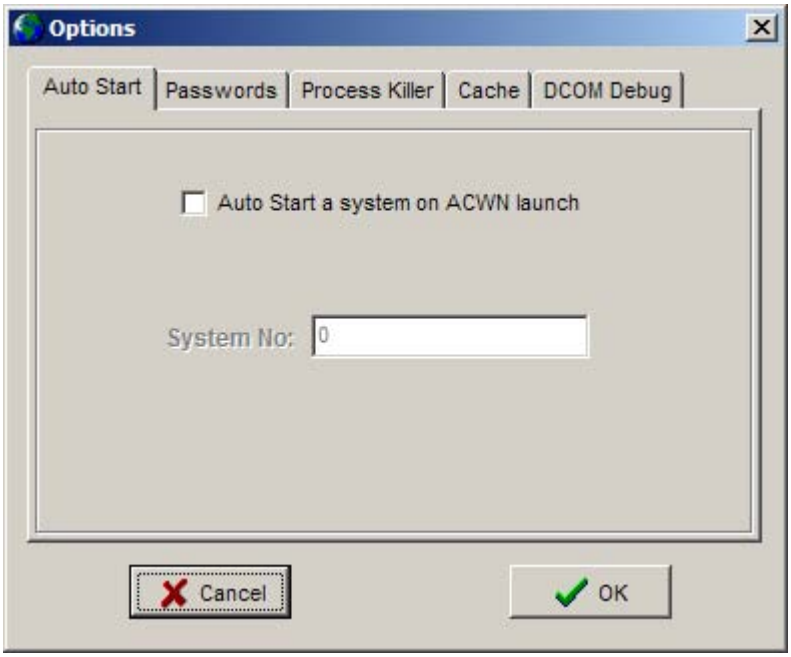
If this is the first time you have started *ACWn* you will need to define a hierarchy of customers, plants, instruments and channels before you can begin to record and store data.
Details in *Configuring the system*..

If you have used *ACWn* before, the most recently used hierarchy will be loaded automatically as the program starts.

Configuring *ACWn* to start automatically

You can set *ACWn* to start a system automatically when *ACWn* is started:

1 In the **Overview** window, select **Options** from the **Tools** menu. The **Options** dialog will be displayed:



2 Select the **Auto Start** checkbox.

3 Enter the number of the system. This is the seven digit number that identifies the system.

4 Click the **OK** button.

Next time you start *ACWn*, the selected system will be connected and started automatically.

Changing the access level

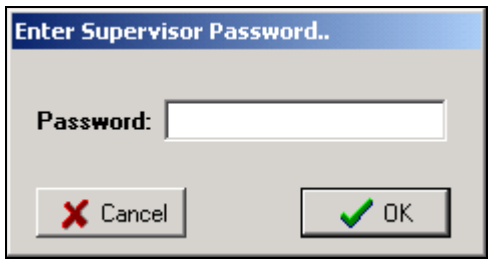
All parameters, except passwords, can be viewed at any access level. Many of the settings described in this section of the manual cannot be altered if you are operating *ACWn* at **Operator** level. Some settings can be changed at **Supervisor** level while the remainder are restricted to users working in **Engineer** level.

To use *ACWn* at **Operator** level requires no password. If you want to access data and parameters at a different level you must enter a valid password for that level.

Working at Supervisor level

To change the access level of *ACWn* to **Supervisor**:

1 In the **Overview** window, open the **Access Levels** menu and select the option **Supervisor**. The **Access Level** dialog box will open.



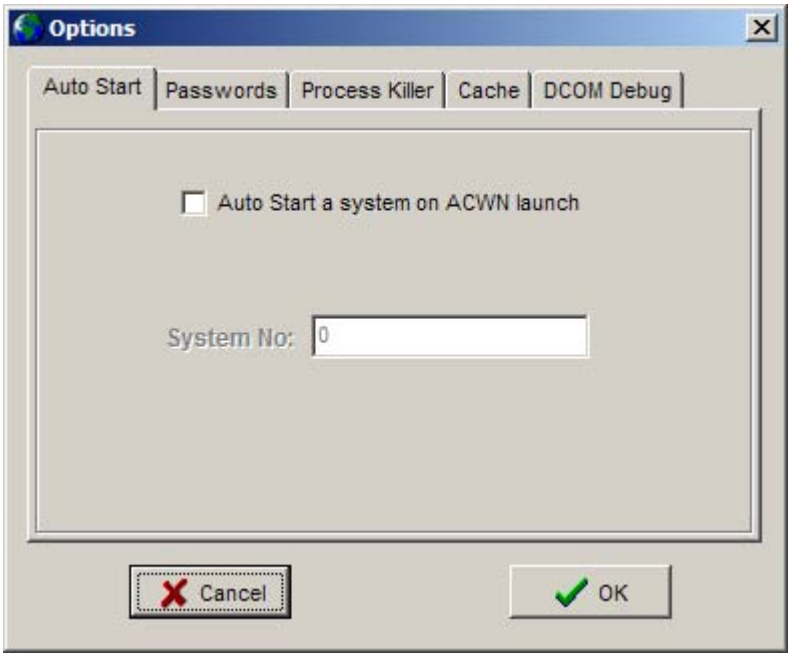
2 Enter the correct password (up to 10 alphanumeric characters), and then click on **OK**. The default value is **supervisor**. The dialog box will close and *ACWn* will operate in **Supervisor** level. The new level will be displayed on the **Overview** window's status bar and a bullet will be shown alongside **Supervisor** in the menu.

Note
When you have completed the configuration changes at Supervisor level, Procal strongly advise you to revert *ACWn* to Operator level. This will prevent accidental changes to the configuration by non-authorised personnel.

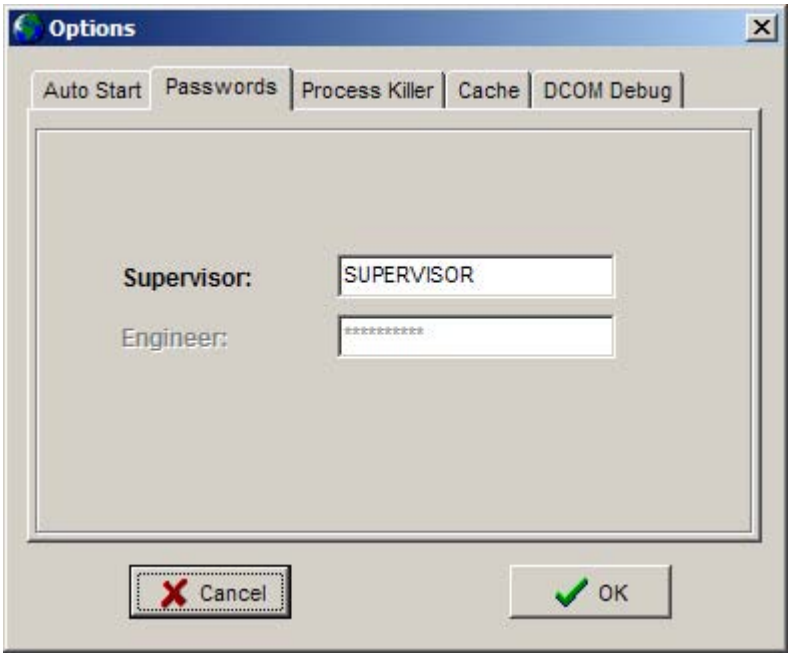
Changing the Supervisor level password

If you have Supervisor level access to *ACWn*, you can change the Supervisor password:

1 In the **Overview** window, select **Options** from the **Tools** menu. The **Options** dialog will be displayed:



2 Click the **Passwords** tab to display the current password:



3 Enter the new password in the **Supervisor** field. You can enter up to 10 alphanumeric characters.

4 Click **OK** to implement the change.

Note
We strongly recommend that you should change the password from its default immediately after system installation, and that you should change it regularly thereafter to prevent unauthorised access to system parameters.

To revert to Operator level

In the **Overview** window, open the **Access Level** menu and select the option **Operator**. *ACWn* will immediately revert to **Operator** level. This will be shown on the **Overview** window status bar and a bullet will be shown alongside **Operator** in the menu.

Engineer level

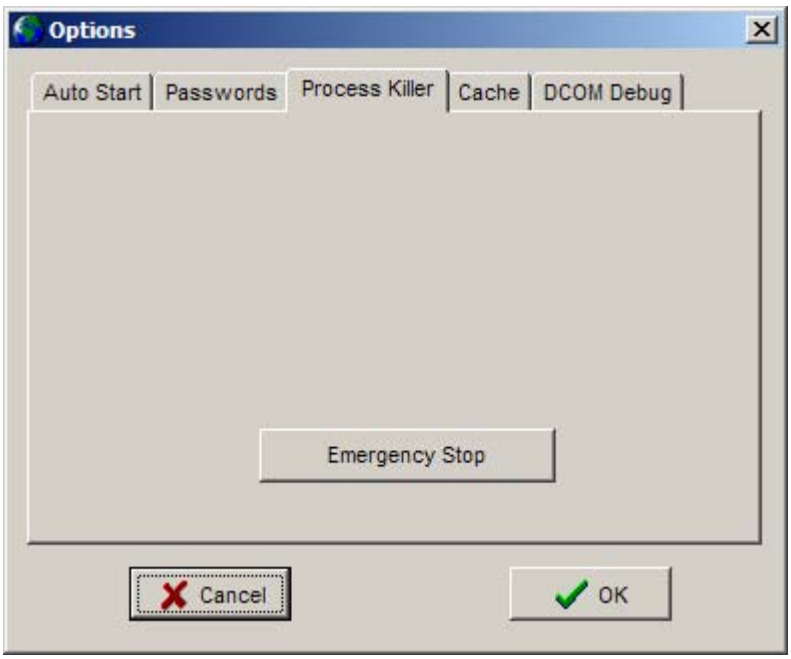
Engineer level is designed to be used only by Procal service personnel during system setup.

Stopping all processes

There may be times when ACWn has a recurring error or the operation of certain sections of the program is irrational. The use of the function Process Killer will close down the program if you are experiencing problems.

Stopping All Processes and Closing ACWn

1 In the **Overview** window, select **Options** from the **Tools** menu. With the **Options** window open select the **Process Killer** tab**:**



2 Click the **Emergency Stop** button. This will stop all processes and close down ACWn.

Software Engineer Tools

The other two sections available in the options window, **Cache** and **DCOM Debug**, are options that are only available at engineer level and should not be altered without instruction from Procal personnel.

Using the program features

ACWn uses many standard features of the Windows environment, and you should make sure that you are familiar with Windows before you start to use *ACWn*. Further information about Windows facilities can be found in the documentation supplied with your Windows software.

Some of *ACWn* prime functions are accessed through icon buttons on the toolbar that is immediately below the menu bar. All functions can be accessed through the menu bar.

To access a function, you must select the relevant menu option or icon button. When a function has been selected, a window will be displayed. A number of features are used within *ACWn*, and any combination of these may be present within a window.

- Toolbar buttons.
- Menus.

- Status bars.
- Dialog boxes.
- Text boxes.
- Drop-down list boxes.
- Command buttons.
- Option buttons.
- Check boxes.

Toolbar buttons

There are three context sensitive toolbars available in *ACWn*. One is available in the **Overview** window, a second is present in all **Panel** and **Trend** windows, and the third is available in the **Test** window. To select a button, move the cursor over it and click it using the left mouse button.

Overview window toolbar

The **Overview** window toolbar is shown below:

From left to right, the toolbar contains the following buttons:

Connect, which connects *ACWn* to the system selected in the left-hand pane.

This button is available only when a disconnected system is selected in the left-hand pane of the **Overview** window. Note that you can only connect one system at any time

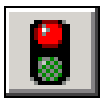
Disconnect, which disconnects *ACWn* from the current system.

This button is available only when a system is connected but is not running.

Start, which starts reading values from the system.

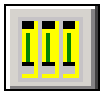
This button is available only when a system has been connected and is waiting to be started.

Stop, which stops readings from the current system.



This button is available only when a system is connected and running.

Panels/Trends Screen, which displays the Panels/Trends window.



This button is available only when a system is connected and running.

Test Screen, which displays the **Test** window.

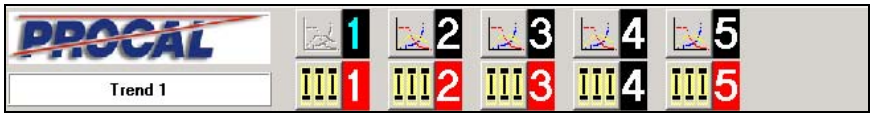
This button is available only when a system is connected and running.

Help, which starts the *ACWn* on-screen help system.

About *ACWn*, which displays version and copyright information for your installation of *ACWn*.

Panel and Trend windows toolbar

The **Panel** and **Trend** windows share the same toolbar, which is shown below:

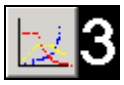


The toolbar consists of two rows of buttons, one to display Trends and the other to display Panels.

The top row contains shortcut buttons to open the **Trend** windows. There will be a **Trend** button on the toolbar, for each **Trend** window. The number of **Trend** buttons will correspond to the number of analyser units and IOUs with analogue input devices connected in your Analyser System. Each button, both **Trend** and **Trend** is made up of two parts:

- An image that mimics the **Trend** window. This is shown as a negative image if the **Trend** window it represents is currently open, as shown below:

The currently selected **Trend** window



A non-selected **Trend** window.

- A number that identifies the **Trend** window.

The lower row contains shortcut buttons to open the **Panel** windows. There will be a **Panel** button on the toolbar, for each **Panel** window. The number of **Panel** buttons will correspond to the number of analyser units and IOUs connected in your Analyser System. Each button, both **Panel** and **Trend** is made up of two parts:

- An image that mimics the **Panel** window. This is shown as a negative image if the **Panel** window it represents is currently open, as shown below

The currently selected **Panel** window

A non-selected **Panel** window.

- A number that identifies the head unit. The default background colour for this number is grey. If an alarm has been activated on the **Panel** window, the background colour changes to red. This can be very useful as it alerts the operator to the alarm status on the head, even if the **Panel** window for that head is not currently being viewed.

Test window toolbar

The toolbar on the **Test** window is combined with the Status bar and is described in detail under the heading *Status bars*.

Menus

A menu is a list of commands that can be implemented within *ACWn*.

ACWn features four context-sensitive menu bars, one on each of the following types of windows:

- **Overview** window.
- **Panel** window.
- **Trend** window.
- **Test** window.

To implement a command, you must open the menu then, if necessary, select the required option.

Opening a menu

To open a menu, you select it either by clicking the title in the menu bar or by holding down the ALT key and pressing the letter that is underlined in the menu title. The menu will then drop down from the menu bar or, in some cases, the required function will execute immediately.

All the commands contained in the menu will be shown, with the first option highlighted. You may not have access to all of the commands, in which case those commands that you cannot select will be shown in grey rather than black.

Selecting an option

To select a menu option you can:

- Click the option.
- Move the highlight to the option, using the arrow keys, then press RETURN.
- Press the letter key underlined in the menu option.

The window selection options can be selected using a combination of keys. In this case, the key combination is shown in the menu opposite the option. You can use the key combination to select the menu option from any window within *ACWn*.

Overview window menus

The menu bar on the **Overview** window contains the following:

- **Exit**, which will close *ACWn*; a message will be displayed if all systems have not been stopped and disconnected.
- **Access Level**, which allows you to change your access level on entry of a valid password.
- **View**, which allows you to display a **Panel**, **Trend** or **Test** window.
- **Tools**, which allows you to configure the auto start and access password features, backup and restore databases, kill processes running within *ACWn,* Change Program Display Language, configure Third Party Software to operate in-conjunction with *ACWn*, and Export OPC Modbus slave Configurations.
- **Help**, which displays the on-screen help system and the version/copyright information for *ACWn*.

Panel/Trend window menus

The menu bar on the **Panel/Trend** window contains the following:

- **View**, which allows you to display the **Overview** or **Test** window and to **Exit PanelsTrend Screen**.
- **Trends**, which allows you to display, add or delete a predefined Trend within the *ACWn* system.
- **Panels**, which allows you to open the Panel displays for optical heads in the system.
- **Configure**, which allows you to re-configure the channels on the currently displayed Panel or Trend display.
- **Scale**, which allows you to change the scale factors of channels in the currently displayed head Trend chart; this option is not available when a panel is displayed.
- **Reports**, which allows you to generate a series of reports for panels and trends.
- **Alarms**, which displays a log of alarms generated over a specified time range.
- **Autocal Log**, which allows you to view auto calibration details for a selected instrument.
- **Help**, which displays the on-screen help system and the version/copyright information for *ACWn*.

Test window menus

The menu bar on the **Panel/Trend** window contains the following:

- **View**, which allows you to display a **Panel**, **Trend** or **Overview** window.
- **AutoZero, allows user to perform *AutoZero* type operations. This menu item is only available for the P5000 instruments**
- **Manual Calibration**, which allows you to calibrate instruments; for more information about calibration, please refer to the section *Viewing data and calibration*. (Not available for Auxiliary Output Unit)
- **Window**, which allows you to configure the instrument data windows either cascaded or tiled format.

- **Help**, which displays the on-screen help system and the version/copyright information for *ACWn*.

Status bars

There are four different status bars that appear in *ACWn.* They are:

- The **Overview** window status bar.
- The **Panel** window status bar.
- The **Trend** window status bar.
- The **Test** window status bar.

Overview window status bar

The status bar on the **Overview** window is to the right of the toolbar just below the menu bar. It shows:

- The time indicated by the local computer clock.
- The time indicated by the remote system clock; this is used only when *ACWn* is monitoring remote instruments.
- Access level (operator, supervisor or engineer).

Panel window status bar

The status bar on the **Panel** window appears below the toolbar. It is divided into six parts that tell the user the current status of both the whole system and the optical head unit or analogue input device represented by the **Panel** window.

The text used in the status bar is colour coded. All warnings and faults are displayed in red. If the status is normal the message text is green or black.

The seven statuses that are reported, are:

- **System**
  System OK — All heads are functioning normally.
  System Fault — A fault exists on one of the heads.
- **Filter Wheel (not on P5000)**
  Filter Wheel OK — The motor is functioning normally.
  Filter Wheel Slow — The motor is faulty.
- **Beta Vectors (only P5000)**
  Beta Vectors OK — Beta Vectors are functioning normally.
  Beta Vectors !!!!Error!!!! — Beta Vectors are faulty.
- **Optical Signal**
  Optical Signal OK — The optical path is clear and the optical source is working.
  Low Optical Signal — Either the optical path is obscured or the optical source is not working.
- **Head Connection**
  Head. OK — The head connection is functioning normally.
  Head Disabled — A fault exists on the head connection.

- **Drive**

  Drive OK — Backup drive selected is ready.
  Drive Low — Insufficient free space on drive specified.
  Drive Not Available – Drive is specified but not ready.
  Drive Not Present – Drive specified does not exist in Windows system. Can be used as an OFF selection.

- **Autozero**

  Autozero OFF — Readings are live.
  Autozero ON — Autozero is in progress. Readings are those last recorded.
  Autozero - pending — The head is awaiting a timed, automatic, autozero
  Autozero - zero purge — Autozero has started and is purging gas from the sample cell.
  Autozero - zero measure — The head is averaging the data with no sample gas present.
  Autozero - zero update — The head is calibrating the zero datum for each channel.
  Autozero - process purge — The head has completed the autozero task and is re-admitting process gas to the sample cell.
  This box will also display the following text relating to other functions and conditions related to Autozero:
  Safety purge on — If the sample cell temperature is below a preset level then a safety air purge will be automatically switched on to prevent acidic sample gas from condensing inside the instrument sample cell, thereby causing rapid corrosion.
  Manual purge on — The user can select this air purge for various diagnostic purposes.

Trend window status bar

The status bar on the **Trend** windows appears below the toolbar. It has only one field that reports the system status:

System OK — All heads are functioning normally.
System Fault — A fault exists on one of the heads.

Test window status bar

There are two status bars on the **Test** window: one at the top of the window, just below the menu bar, and one at the bottom.

The top status bar is divided into two main parts. The upper portion also shows the local computer date and time. In the lower portion a button will be present for each analyser unit or IOU configured in *ACWn*. The number and status of the unit is given on the button. These are shortcut buttons to open the **Data Window** for the optical heads and analogue input devices.

The bottom status bar also shows system time and also has two fields showing the data poll status.

Dialogs and windows

Dialogs are special windows used to enter information into *ACWn*. Dialogs are called in *ACWn* by selecting menu option that is followed by an ellipsis (...).

Dialogs are used to display messages and information, and also to allow the input of information. Entering information can involve any combination of the following:

- Text boxes.
- Drop-down list boxes.
- Command buttons.
- Option buttons.
- Check boxes.

These are described later in this section.

Many of the dialogs used within *ACWn* require the input of more than one piece of information. The current entry point is marked by a selection cursor, which may be a dotted rectangle, a highlight, or a vertical line. To move to a different option you can use either the mouse or the keyboard.

To use the mouse, just left-click with the cursor on the required option or area. The selection cursor will move to that option. Using the keyboard, you can press TAB to move the selection cursor through the options and areas. Pressing SHIFT + TAB moves the selection cursor back to the previous option or area.

Tip
If the option or area you want to select has an underlined letter in its name, you can choose that item by holding down the ALT key and pressing the underlined letter.

Drop-down list boxes

List boxes display lists of choices from which you can select one option. A drop down list box appears initially as a box showing one selection. If you select the down arrow at the right-hand end of the box, a list of all available choices will be displayed. If the list is too long to show all choices, scroll bars will be provided.

Note
Choices are not in alphabetical order.

To select a choice using the mouse

1 Open the box by clicking the down arrow at the right of the box.

2 Scroll through the list until you find the required choice.

3 Click the choice, which will then be selected. The list will close and the selected choice will be displayed in the box.

To select a choice using the mouse and keyboard

1 Open the box by clicking the down arrow at the right of the box.

2 Use the UP and DOWN arrows to highlight the required choice.

3 Press RETURN. The list will close and the selected choice will be displayed in the box.

To select a choice using the keyboard

1 Highlight any current entry in the box.

2 Enter the first character (or the first few characters) of the choice. The first choice in the list beginning with this character sequence will be selected.

3 If the choice is not the one that you require, enter the character sequence again. The next choice starting with the sequence will be selected. Continue with this until the required choice is selected.

Command buttons

Command buttons are used to initiate an action (common buttons are **OK** and **Cancel**). These buttons are shown with a grey background, to represent keyboard style keys, and are usually located at the bottom of a dialog box.

Some command buttons are not available all the time. When a button is not available, it is dimmed and cannot be selected.

To select a command button you can either click the button or move the highlight to the button and press RETURN.

Option buttons

Option buttons are used to represent a group of options from which only one can be selected. They are shown as a series of circles, one per option, with the option description alongside each button. The selected option contains a black dot. If any options are not available, the description is dimmed.

To select an option you can either click the option or press the space bar until the required option is selected. When you select a new option, the previous option is deselected automatically.

If the description of the option contains an underlined character, then entering this character will select the option.

Check boxes

Check boxes are used to tag a choice from a number of options and then indicate that choice. They are shown as square boxes, each accompanied by a description of the option. When an option is selected, a tick (✓) appears in the box. If any options are not available, the description is dimmed.

To select an option you can either click it or press the space bar until it is selected. If the description of the option contains an underlined character, then selecting ALT and this character will select the option.

If you click on a check box already containing a tick (✓), the tick (✓) will be deleted and the option deselected.

International settings

This manual has been written, and the screen shots taken From a PC running *ACWn* using **UK English** as the default system setting. If you are running *ACWn* on a machine with a different international setting, you may see some differences in the way certain data is displayed.

The conventions of this manual are as follows:

1234.5 one thousand two hundred and thirty four point five.

29/01/98 29th January 1998.

When the International setting results in a comma being used as the decimal separator, for example, Spanish, then it is essential that when any data is entered that includes a decimal point that the comma character is used to denote this and not the point used when the International setting is English. Failure to observe this will result in entry of incorrect data.

Changing the language

With the use of ACWn in a country other than the UK a modified version of the program can be obtained. This version will have the option to change the core language used throughout the program.

To change the language

1 Firstly select **Language** from the **Tools** menu. This will bring up a window with a pull down menu of languages available:

2 Select the language required from the list and press the **OK** button.

3 The program will now translate all text into the chosen language.

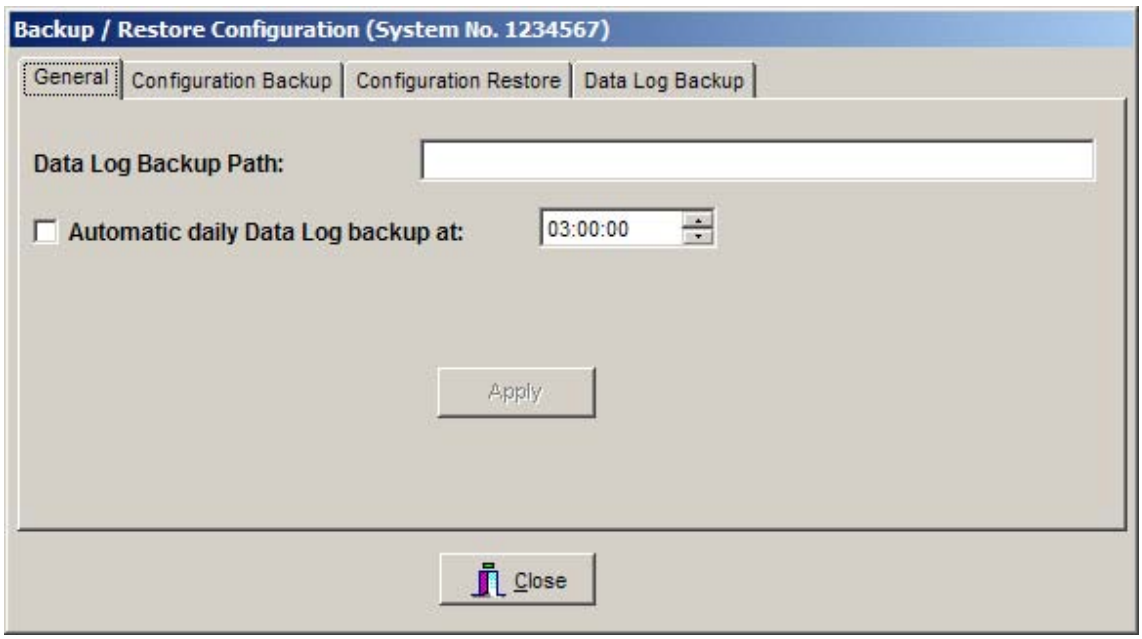
Backing up data

You can save the hierarchy configuration onto hard disk to be restored when required. This allows you to maintain a number of different system configurations, then select the required hierarchy at any time.

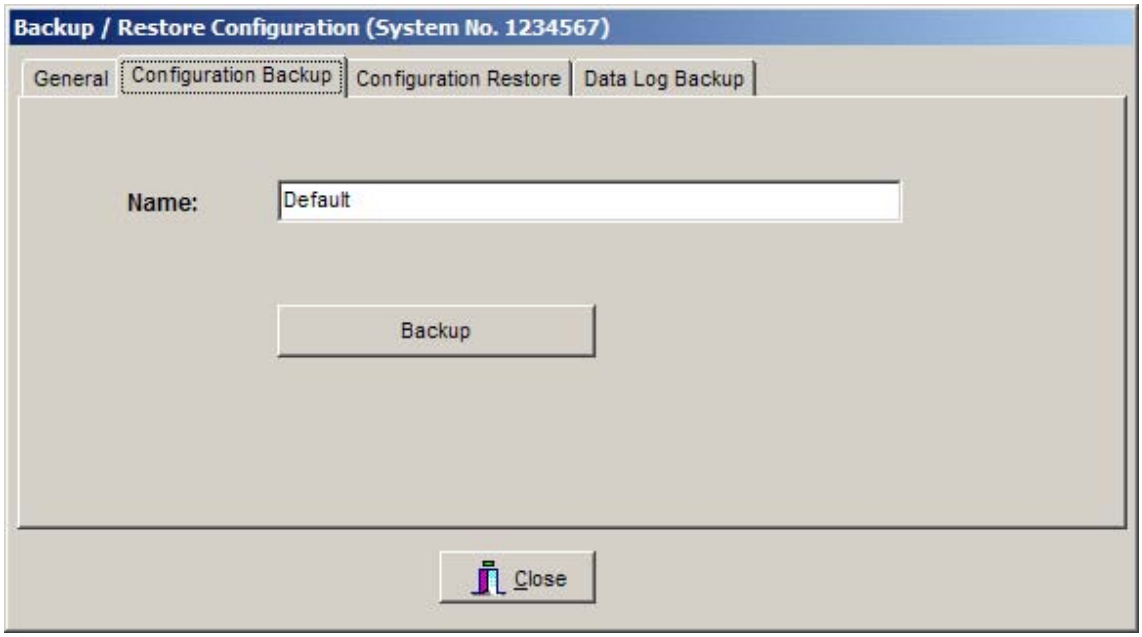
Backing up a configuration

To back up the current configuration:

1 In the **Overview** window, select **Backup/Restore** from the **Tools** menu. This will display the **Backup/Restore Configuration** dialog:



2 With the **Configuration Backup** tab selected, enter a suitable name for the back up file and click the **Backup** button:



The configuration will be saved in the folder
C:\Program Files*ACWn*\BM\Databases\Configuration
and a message box will be displayed indicating that the backup is complete.

3 Click the **OK** button to dismiss the message box.

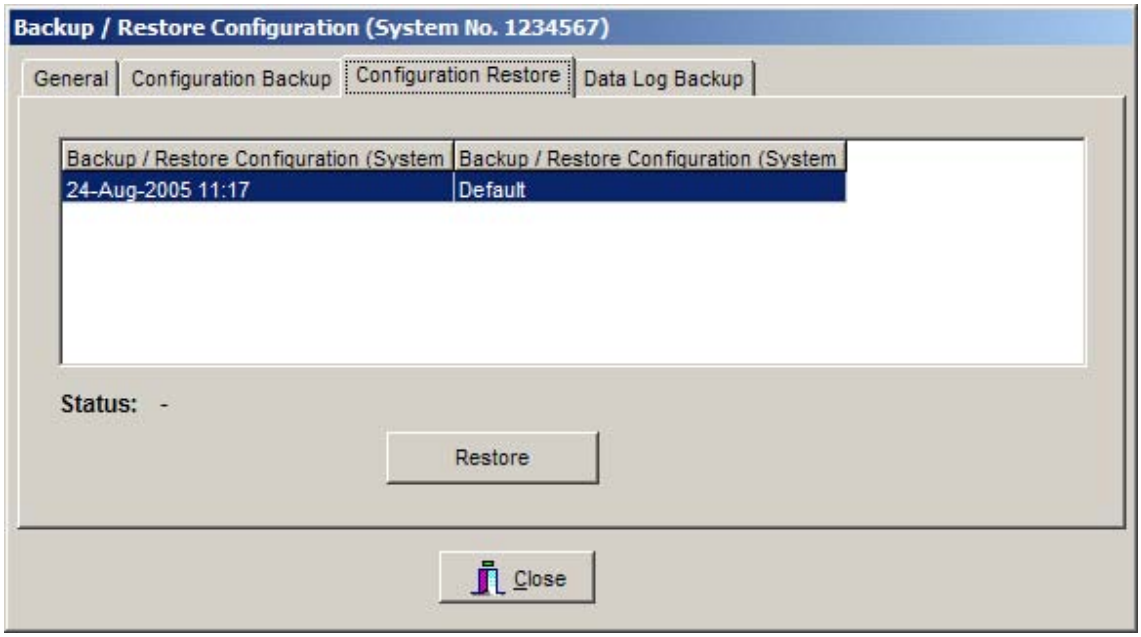
Note
Only the configuration hierarchy will be saved. Measured data cannot be backed up using this method.

Restoring a configuration

You can restore a backed up configuration at any time:

1 In the **Overview** window, select **Backup/Restore** from the **Tools** menu. This will display the **Backup/Restore Configuration** dialog.

2 Select the **Configuration Restore** tab to show a list of backed up configurations:



3 Select the configuration to be restored and click the **Restore** button. The system will be restored.

Note
If your system was connected and running, it will be stopped and disconnected before the restore operation is performed. After the restore, the system will be connected but will not be started.

4 Click the close button to close the **Backup/Restore Configuration** dialog.

Data Log Backup

This is a facility intended only to provide diagnostic information to Procal Analytics Ltd in the event of unexpected program operation. The user may be requested by Procal Analytics or its representative to use the print facility on this form so that the information can be transmitted back to Procal for analysis.

Closing *ACWn*

Under normal circumstances *ACWn* should remain running at all times.

WARNING
CLOSING *ACWN* WILL STOP ALL MONITORING AND RECORDING OF DATA FROM ALL THE CONNECTED HEADS.

If you need to close *ACWn,* follow the numbered steps below.

1. Make sure all *ACWn* initiated operations, such as auto zeroing, manual calibration or report generating, have ceased and that all dialog boxes are closed.
2. An access level of Supervisor or higher is required to Stop the running process.
3. Stop the current instrument then disconnect it.
4. Click **Exit** on the toolbar. The program will close with no further warning.

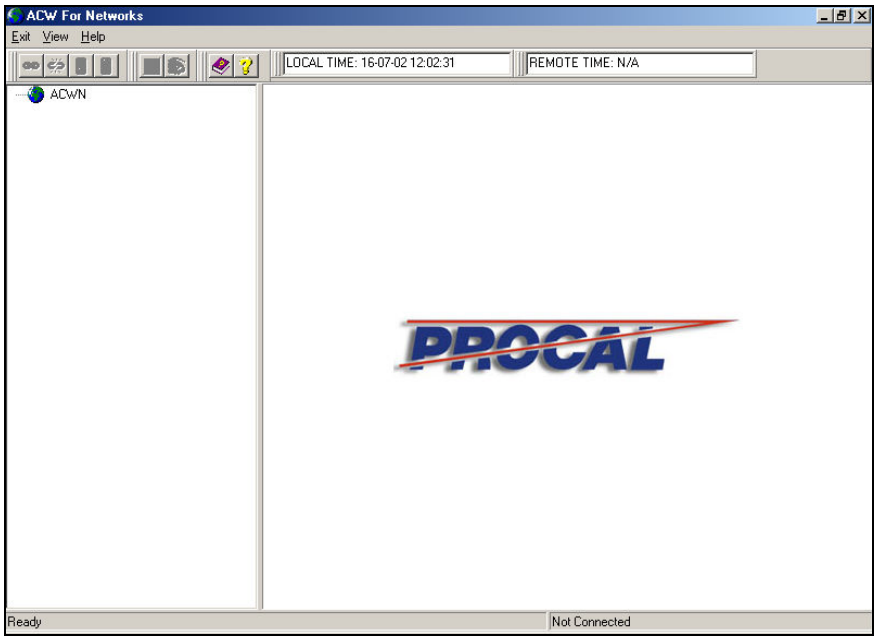
4 Configuring the system

The *ACWn* software reads, stores and analyses data from Procal instruments. You can build a system hierarchy to represent the real-world organisation of the instruments.

You can define a number of customers, and each customer can contain plants. Within each plant you can define a number of systems, each containing the actual instruments to be monitored

Before you can use *ACWn* to monitor and display readings from head units, you must define the hierarchy containing the instruments that the program will read. You can then connect and start the systems, and configure the alarms for each instrument.

When you first open *ACWn*, an empty **Overview** window will be displayed:



You must build a hierarchy of customers, plants and systems with channels.

Configuring customers

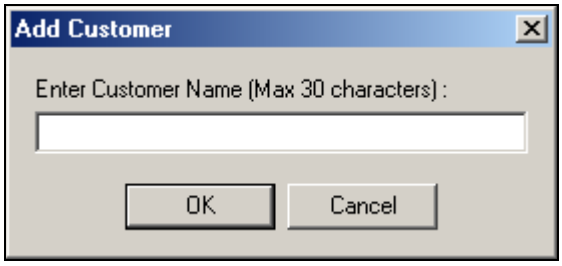
Customers are the top level you can define within the hierarchy. These are shown under the *ACWn* icon in the left-hand pane of the **Overview** window. You can:

- Add new customers.
- Modify existing customers.
- Delete customers.

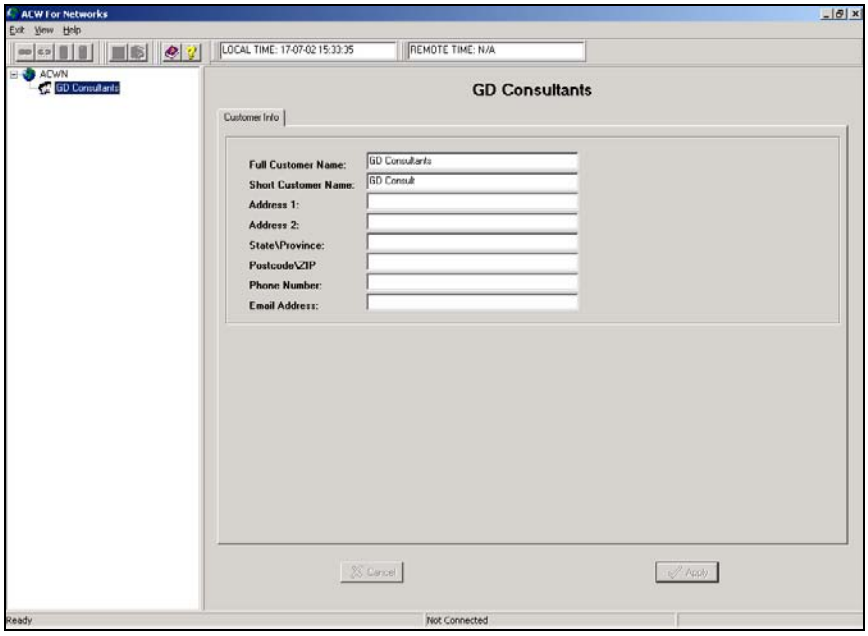
Adding a new customer

To add a new customer to the hierarchy:

1 Right-click the ***ACWn*** icon in the left-hand pane of the **Overview** window and select **Add Customer** from the option menu. This will display the **Add Customer** dialog:



2 Enter the name of the customer, up to 30 characters, and click **OK**. This will display the new customer's icon in the left-hand pane and a blank customer form in the right-hand pane:



Note that you may not be able to see the whole of the right-hand pane, and you may need to scroll to see the whole window. Your PC's screen resolution determines the portion of the window displayed.

3 Enter the customer's address and contact details.

4 Click the **Apply** button to implement the customer details.

Modifying details of an existing customer

You can modify the address and contact details for an existing customer:

1 Select the customer icon from the hierarchy in the left-hand pane of the **Overview** window. This will display the customer's details in the right-hand pane.

2 Make the required changes to the details.

3 Click the **Apply** button to implement the changes.

Deleting a customer

Caution

Deleting a customer will delete all the plants and systems associated with that customer.

To delete a customer from the system hierarchy:

1 Right-click the customer icon from the hierarchy in the left-hand pane of the **Overview** window and select **Delete Customer** from the option menu. This will display a warning message.

2 Click the **Yes** button to delete the customer.

Configuring plants

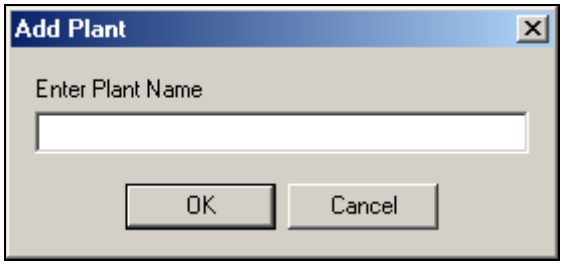
Plants are the second level you can define within the hierarchy, and each plant is allocated to a customer. Plant icons are shown under the appropriate customer in the left-hand pane of the **Overview** window. You can:

- Add new plants.
- Modify existing plants.
- Delete plants.

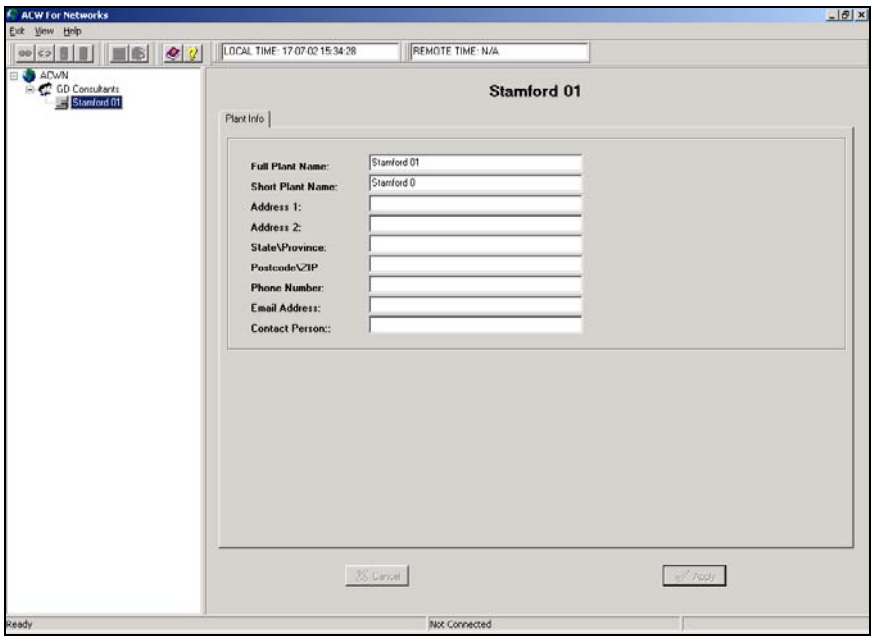
Adding a new plant

To add a new plant to any customer in the hierarchy:

1 Right-click the appropriate customer icon in the left-hand pane of the **Overview** window and select **Add Plant** from the option menu. This will display the **Add Plant** dialog:



2 Enter the name of the plant and click **OK**. This will display the new plant's icon in the left-hand pane and a blank plant form in the right-hand pane:



Note that you may not be able to see the whole of the right-hand pane, and you may need to scroll to see the whole window. Your PC's screen resolution determines the portion of the window displayed.

3 Enter the plant address and contact details.

4 Click the **Apply** button to implement the plant details.

Modifying details of an existing plant

You can modify the address and contact details for an existing plant:

1 Select the plant icon from the hierarchy in the left-hand pane of the **Overview** window. This will display the plant's details in the right-hand pane.

2 Make the required changes to the details.

3 Click the **Apply** button to implement the changes.

Deleting a plant

Caution

Deleting a plant will delete all the systems and instruments associated with that plant.

To delete a plant from the system hierarchy:

1 Right-click the plant icon from the hierarchy in the left-hand pane of the **Overview** window and select **Delete Plant** from the option menu. This will display a warning message.

2 Click the **Yes** button to delete the plant.

Configuring systems

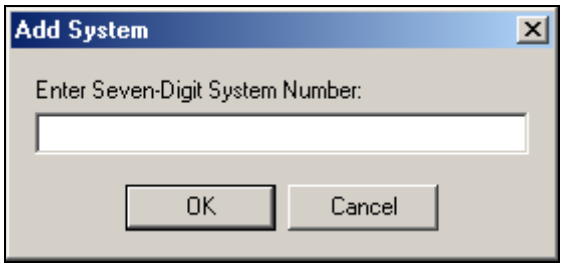
Systems are allocated to a plants. System icons are shown under the appropriate plant in the left-hand pane of the **Overview** window. You can:

- Add new systems.
- Modify existing systems.
- Delete systems.

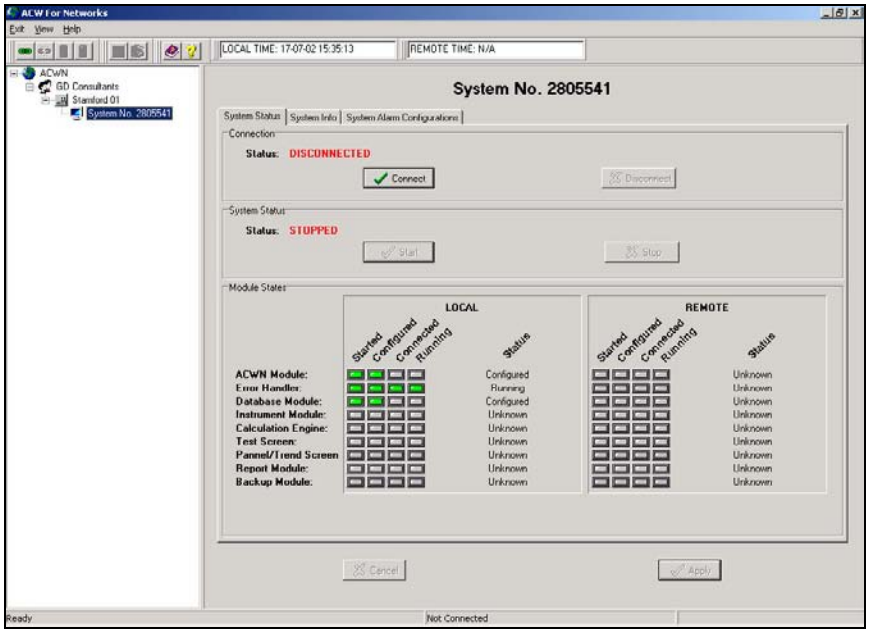
Adding a new system

To add a new system to any plant in the hierarchy:

1 Right-click the appropriate plant icon in the left-hand pane of the **Overview** window and select **Add System** from the option menu. This will display the **Add System** dialog:

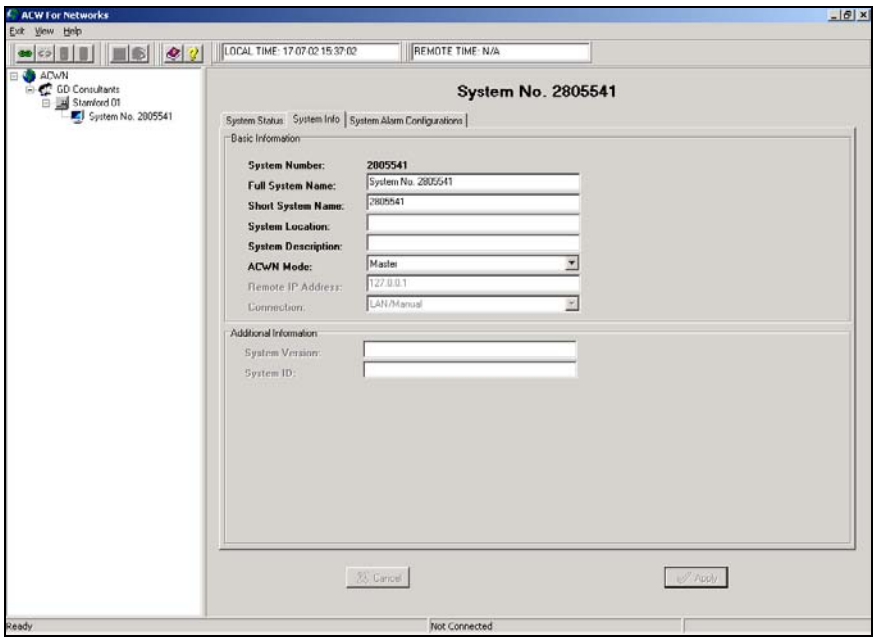


2 Enter the system number, which must have seven digits and will start with 88. Then click **OK**. This will display the new system's icon in the left-hand pane and basic system details in the right-hand pane:



Note that you may not be able to see the whole of the right-hand pane, and you may need to scroll to see the whole window. Your PC's screen resolution determines the portion of the window displayed.

3 Click the **System Info** tab to display the default configuration information for the new system:



4 Enter the system details.

5 Click the **Apply** button to implement the system details.

Modifying details of an existing system

You can modify the configuration details for an existing system:

1 Select the system icon from the hierarchy in the left-hand pane of the **Overview** window. This will display the system's details in the right-hand pane.

2 Click the **System Info** tab to display the current configuration information for the system.

3 Make the required changes to the configuration.

4 Make any other required changes by clicking the appropriate tab and amending the entries.

5 Click the **Apply** button to implement the changes.

Deleting a system

Caution

Deleting a system will delete all the instruments associated with that system.

To delete a system from the hierarchy:

1 Right-click the system icon from the hierarchy in the left-hand pane of the **Overview** window and select **Delete System** from the option menu. This will display a warning message.

2 Click the **Yes** button to delete the system.

Configuring instruments

Instruments are the lowest level you can define within the hierarchy, and each instrument is allocated to a system. Instrument icons are shown under the appropriate system in the left-hand pane of the **Overview** window. You can:

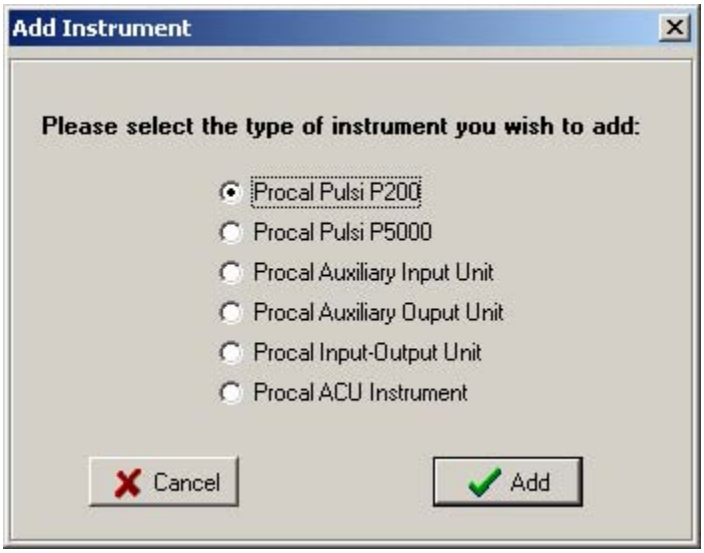
- Add new instruments.
- Modify existing instruments.
- Configure channels for instruments.
- Delete instruments.

Adding a new Instrument

To add a new instrument to any system in the hierarchy:

1 Ensure that the access level is Engineer and the appropriate system is stopped but is connected, as described in *Connecting and starting a system*.

2 Right-click the appropriate system icon in the left-hand pane of the **Overview** window and select **Add Instrument** from the option menu. This will display the **Add Instrument** dialog:



3 Select the type of instrument to be added and click the **Add** button. The configuration parameters for the instrument will be displayed in the right-hand pane of the window. There are up to six tabs containing parameters for each instrument:

- Instrument Info.
- Communication Parameters.
- Compensations.
- Temperature Control.
- AutoZero/AutoCal.
- Alarm Configurations.

These tabs are described later in this section under the heading *Instrument parameters*. Some tabs contain parameters that do not apply to all instruments. Only the appropriate tabs are displayed for each instrument type.

4 Make any required changes to the parameters. Some parameters on the **Instrument Info** tab are specific to the type of instrument selected.

5 If you changed any parameters, click the **Apply** button to implement the changes. The instrument will be added with a default set of channels. These channels will vary according to the type of instrument selected, but you can add or delete channels as required as described under the heading *Configuring channels*.

Modifying details of an existing instrument

You can modify the configuration details for an existing instrument:

1 Select the instrument icon from the hierarchy in the left-hand pane of the **Overview** window. This will display the instrument's details in the right-hand pane.

2 Click the **Instrument Info** tab to display the current configuration information for the instrument.

3 Make the required changes to the configuration.

4 Make any other required changes by clicking the appropriate tab and amending the entries.

5 Click the **Apply** button to implement the changes.

Deleting an instrument

Caution

Deleting a system will delete all the channel information associated with that system.

To delete an instrument from the hierarchy:

1 Right-click the instrument icon from the hierarchy in the left-hand pane of the **Overview** window and select **Delete Instrument** from the option menu. This will display a warning message.

2 Click the **Yes** button to delete the instrument.

Exporting an Instrument Details

Exporting an instrument details will add to another system with optional reassignment of all that system's instrument ID numbers.

1 Stop the system you wish to export

2 From the tools menu select instrument export.

3 Choose between; Export system for editing and Export Instruments to existing system.

4 Select system to export

5 Select Export

Instrument parameters

There are up to six tabs containing parameters for each instrument:

- Instrument Info.
- Communication Parameters.
- Compensations.
- Temperature Control.
- AutoZero/AutoCal.
- Alarm Configurations.

Instrument Info

The following information is contained in the **Instrument Info** tab for all instrument types:

you see	*you enter or see*
Instrument type	This display-only field shows type of optical head unit.
Internal Instrument ID	Instrument's identification number.
Full Instrument Name	You can enter the name of the head unit. The default is an instrument number derived from the system configuration.

you see	*you enter or see*
Instrument Serial Number	The serial number of the head unit. You can change this if required, but you cannot use the same number for two instruments.
Instrument Enabled	Select whether this instrument is ENABLED or DISABLED. This allows you to have an instrument and its channels to the hierarchy but block communication with that instrument.
Communication Protocol	Select the protocol used to communicate with this instrument.
Smoothing %	The analyser updates readings every 1 to 2 seconds. As there are random variations in individual readings due to thermal noise and optical effects, the displayed values are averaged to give a more realistic value. This average is set as a percentage of the previous running value, and is normally set to 95%. Setting to a lower figure will provide less averaging, show more short-term fluctuation and will, electronically, respond to changes more quickly. Setting the percentage higher will cause the data to vary more slowly and show less short-term variation. The range of values available is 0 to 99.9%
Limit minimum readings to Scale Minimum	If checked limits minimum readings to Scale minimum.
Instrument Display Position	The number indicates the position of this instrument in the hierarchy, and also the number of the panel for this instrument in the **Panel/Trend Screen**. You can change the instrument's position using the arrow buttons.

In addition to this information, there are parameters that are specific to each type of instrument handled by *ACWn*.

Pulsi 200 specific parameters

The following parameters will be shown on the **Instrument Info** tab for Pulsi 200 instruments:

you see	*you enter or see*
IR/UV Detectors	This shows the number of detectors connected to the instrument. In the majority of cases only one optical detector is fitted, though sometimes there may be two.
Source Control	**Power level set at Procal for type of Source fitted.**
Phasing	This option is used to set the points on the detector waveform at which measurements are taken. It is set during calibration, and should not be changed.
Cross Sense Maths Version	This sets the Cross sense maths version for compatibility with legacy instrument calibrations or the current version. **Procal to set only**
Use Error Bandwidth Maths	Included for compatibility with certain instruments. Procal to change only.
Drive #	Drives 1 to4, assign function of Auxiliary Outputs

Pulsi 5000 specific parameters

The following parameters will be shown on the **Instrument Info** tab for Pulsi 5000 instruments:

you see	*you enter or see*
Source Volts	This shows the filament voltage supplied to the UV lamp in the instrument. This value is set during calibration and should not be changed.
Cal Spec Interval	This sets the interval for each phase of the Calibrate Spectrometer. You can select the interval in hours and minutes.
Cal Spec Phase	This sets the time allowed for each phase of the spectrometer calibration, in seconds.
Use Darkstrip numbers	This enables the operation of the Darkstrip numbers
Darkstrip Start	Once “Use Darkstrip Numbers” is selected, you will be required to enter the Start of the Darkstrip, ranging from 0 to 1023
Darkstrip Length	Once “Use Darkstrip Numbers” is selected, you will be required to enter the Length of the Darkstrip, ranging from 0 to 1023
Head Temperature Control	Selects Mk1, 2 or 3 for legacy and current instrument systems. For Procal use only
Drive #	Configure the devices to be driven by the specific hardware driver

you see	*you enter or see*
Diode Shift Detection	Select the Diode Shift Detection mode
Peak # Start	Diode number for the start of peak as indicated
Peak # End	Diode number for the end of peak as indicated
Peak # Correct	Diode shift to be corrected for the peak as indicated
P5000 Comms message length	For legacy and current compatibility. For Procal use only.

Auxiliary Input Unit specific parameters
There are no parameters specific to the Auxiliary Input Unit.

Auxiliary Output Unit specific parameters
The following parameters will be shown on the **Instrument Info** tab for Auxiliary Output Units:

you see	*you enter or see*
Current Transmitters	This shows the number of transmitters currently assigned to the instrument (0, 16 or 32).

Input-Output Unit specific parameters
The following parameters will be shown on the **Instrument Info** tab for Input-Output Units:

you see	*you enter or see*
Relays	This shows the number of relays currently assigned to the system (0, 16 or 32).

Analyser Control Unit specific parameters
The following parameters will be shown on the **Instrument Info** tab for Analyser Control Units:

you see	*you enter or see*
Show Test Screen CalSpec/ Rotaspan box	Tick to display status on Test Screen. Only relevant to P5000.
Power Off/Boot Up Auto Zero	Tick to enable the function. If enabled, on power up Autozero is initiated when Sample Reference Temperature is achieved.
Sample Reference Temperature For Above	Temperature level to initiate Auto Zero.

Communication Parameters

The following information is contained in the **Communication Parameters** tab for all instrument types:

you see	*you enter or see*
COM Port	This shows the PC COM port number through which the connection is made to this instrument.

you see	*you enter or see*
Modbus Address	This shows the address of the instrument on the Modbus communication link.
Baud Rate	This field shows the communication rate between the PC and the instrument.
Parity	Select the type of parity used in communication with the instrument (No, Even, Odd).
Data Bits	This shows the number of data bits contained in each word of communication.
Stop Bits	This shows the number of stop bits at the end of each word of communication.
Timeout	This shows the period (in ms) after which the connection will be broken if there is no communication between *ACWn* and the instrument.

Compensations

The following information is contained in the **Compensations** tab for all instrument types:

you see	*you enter or see*
Head Temperature Channel Assigned	Select this checkbox to assign a channel for head temperature compensation. Note that compensation can be taken from another instrument in the system if required.
Head Temp Instrument	You can select the instrument from which the head temperature is taken as the standard for compensation. The list contains all the applicable instruments in the system.
Head Temp Channel	You can select the channel of the component used for the compensation. The list contains all the channels defined for the selected compensation instrument.
Reference Temperature	You can enter the temperature that will be used as a reference for the compensation. The default value is 25.
Sample Temperature Channel Assigned	Select this checkbox to assign a channel for sample temperature compensation. Note that compensation can be taken from another instrument in the system if required.
Sample Temp Instrument	You can select the instrument from which the sample temperature is taken as the standard for compensation. The list contains all the applicable instruments in the system.

you see	*you enter or see*
Sample Temp Channel	You can select the channel of the component used for the compensation. The list contains all the channels defined for the selected compensation instrument.
Reference Temperature	You can enter the temperature that will be used as a reference for the compensation. The default value is 25.
Pressure Channel Assigned	Select this checkbox to assign a channel to apply pressure compensation to this instrument. Note that compensation can be taken from another instrument in the system if required.
Pressure Instrument	You can select the instrument from which the pressure is taken as the standard for compensation. The list contains all the applicable instruments in the system.
Pressure Channel	You can select the channel of the component used for the compensation. The list contains all the channels defined for the selected compensation instrument.
Reference Pressure	You can enter the pressure that will be used as a reference for the compensation. The default value is 1020.
Water Channel Assigned	Select this checkbox to define a set point for water vapour used in the dry basis calculation.
Water Instrument	You can select the instrument from which the water vapour level used for the compensation is taken. The list contains all the applicable instruments in the system..
Water Channel	You can select the channel of the component used for the compensation. The list contains all the appropriate channels defined for the selected compensation instrument.
Normalisation Channel Assigned	Select this checkbox to assign normalisation (diluent correction) to readings from this instrument. Note that normalisation can be taken from another instrument in the system if required.
Normalisation Instrument	You can select the instrument from which the gas component used for the normalisation is taken. The list contains all the applicable instruments in the system.
Normalisation Channel	You can select the channel of the component used for the normalisation. The list contains all the channels defined for the selected normalisation instrument.

you see	*you enter or see*
Normalisation Level	You can enter the level of the normalisation component at which the process is expected to run.
Normalisation Type	You can select the type of normalisation to be applied. The list contains all the applicable types for the selected instrument.

Temperature Control

The following information is contained in the **Temperature Control** tab for all instrument types:

you see	*you enter or see*
Type	You can select the type of **HEAD** temperature control (from None, Fan cooler, Vortex cooler, heater or any combination).
Setpoint	This determines the head temperature to be maintained by the cooling and/or heating system. There are several optional extras. This value is adjusted, if Adapt is selected, on a daily basis to adapt to the environment to give optimal stability between auto zeros. The default is 25.
Adapt	You can select this to allow modification of the head temperature Setpoint to reflect the mean head temperature measured over the previous 24 hours.
Proportional Term	Head cooling proportional term and head heating proportional term. A gain setting dependant on the thermal system parameters. This should not be changed.
Integral Term	This is to provide for removal of long term error. This should not be changed.
Derivative Term	This is a differential term for cooler and heater to provide faster response. This should not be changed.
Type	You can select the type of **SAMPLE** temperature control (from None, Heater, Cooler). Options are to fit ISH (heater) and ISC (cooling probe). This shows the for the associated sample cell control (an optional extra). The default is 25.
Proportional Term	This can be used in combination with the integral term to eliminate periodic oscillation of the sample temperature.
Integral Term	This can be used in combination with the proportional term to eliminate periodic oscillation of the sample temperature.
Derivative Term	This is a differential term to provide faster response.

AutoZero/AutoCal

The following information is contained in the **AutoZero/AutoCal** tab for P200 and P5000 instrument types:

you see	*you enter or see*
Autozero control	You can select the control option for this instrument, from Master(default) and Slave. This is used on extractive analyser systems where a common gas path is used through two or more sample cells.
Timed Autozero	You can select whether Autozero is to run automatically at set time intervals.
Interval	You can enter the time (in hours) at which the Autozero cycle will be repeated automatically. The default is 12 hours.
Offset from Midnight	You can enter the time delay (in hours) from midnight after which the first Autozero will be started. The default is 0.
Zero Purge Period	You can enter the time allowed (in minutes) for the zero gas to expel the sample gas from the sample cell. The procedure to set the zero gas flow rate is described in the *Operating Manual* for the particular optical head unit. The default value is 1 minute.
Cal Gas Purge Period	You can enter the time allowed (in minutes) for a span gas to fill the sample cell. The default value is 1 minute.
Measure Period	The measure period follows the zero flush cycle of the Autozero. During the measure period any zero error is accumulated prior to averaging and correction. By default this time is one minute, but in exceptional circumstances (particularly on very high sensitivity analysers) this may be increased to four or five minutes to ensure the consistency of the Autozero. This period is also used to set the time during which automatic measurement of calibration gas is made.
Process Purge Period	At the end of the Autozero cycle the purge air or calibration gas is switched off and the sample gas permeates back into the cell. The process purge period is introduced to allow the analyser reading to return to a true value before being 'unfrozen' and becoming live again. The default value is 1 minute.
Special Purge	Tick box selects special purge Gas input during Auto Zero cycle instead of Air.
Special Purge Name	Name entered to appear on Status messages when in use

you see	*you enter or see*
'Autocal OK' Limit	Set to OFF if Autocalibration not required, set to 5% or 10% as a limit if Autocalibration required. Autocalibration is described in *Instruments with autocalibration*.
Interval	You can set the time interval (in hours) at which Autocalibration will be run. The default is 12 hours.
Adjust Calibration	Select this checkbox if Autocalibration is to adjust the calibration automatically if any detected deviations are within the selected **Autocal OK** limit.
Timed Blowback	ON/OFF selection, default OFF Select if Blowback accessory to be driven.
Interval	1 to 999 hours, default 24. Interlocked with AutoZero such that first to start completes delaying the other start.
Offset From Midnight	0 to 23 hours, default 4.
Purge Period	0 to 99 seconds, default 60 seconds. Period of Blowback operation.
Hold Period	0 to 10 minutes, default 5. Hold follows purge, no blowback, normal solenoids but readings frozen.
Air Purge On During Blowback	Tick to enable. Default OFF Allows air purge on during blowback to restrict ingress of dust.
Pulse On Period	2- 98 seconds in 2 second steps. Default 2. Blowback drive on for pulsed operation.
Pulse Off Period	2- 98 seconds in 2 second steps. Default 4. Blowback drive off.

Alarm Configurations

This tab displays the configuration details of each alarm defined for the selected instrument. Note that none of these values can be changed, as they are entered during alarm configuration.

For more information please refer to the heading *Configuring alarms*.

Configuring channels

You can define channels that will be used to receive information from each instrument. The channels define the data that will be recorded, displayed and analysed by *ACWn*.

Six types of channel can be set up:

- Measured.
- DC.
- Derived.
- Relay.
- Transmitter.
- Digital Input.

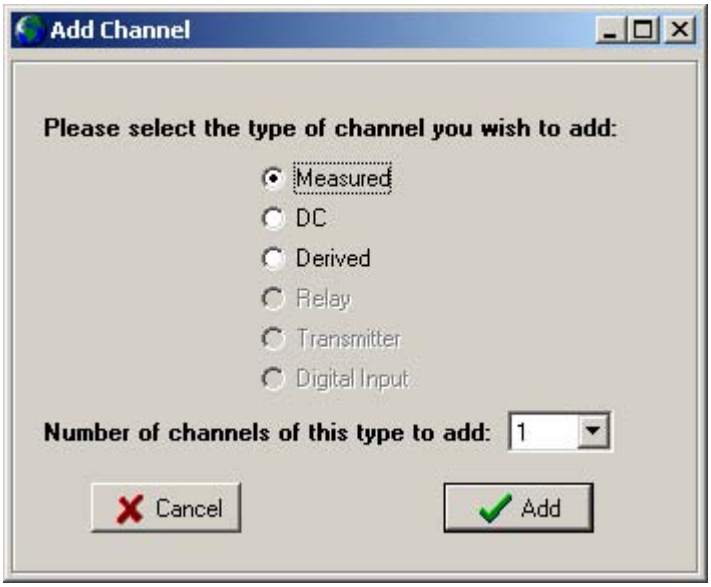
Note that each type of instrument has its own combination of available channel types.

Adding a new channel

To add a new channel to any instrument in the hierarchy:

1 Ensure that the system containing the instrument is stopped but is connected, as described in *Connecting and starting a system*.

2 Right-click the appropriate instrument icon in the left-hand pane of the **Overview** window and select **Add Channel** from the option menu. This will display the **Add Channel** dialog:



Note that the actual channel options available will depend on the type of instrument.

3 Select the type of channel to be added and click the **Add** button. The configuration parameters for the channel will be displayed in the right-hand pane of the window. There are up to five tabs containing parameters for each channel:

- Channel Info.
- Calibration Coefficients.
- AutoZero Configuration.
- Cross Sensitivity.
- Channel Alarm Configurations.

These tabs are described later in this section under the heading *Channel parameters*. Some tabs contain parameters that do not apply to all channels. Only the appropriate tabs are displayed for each channel type.

4 Make any required changes to the parameters. Some parameters on the **Channel Info** tab are specific to the type of channel selected.

5 If you changed any parameters, click the **Apply** button to implement the changes.

Modifying an existing channel

You can modify the configuration details for an existing channel:

1 Select the channel icon from the hierarchy in the left-hand pane of the **Overview** window. This will display the channel's details in the right-hand pane.

2 Click the **Channel Info** tab to display the current configuration information for the channel.

3 Make the required changes to the configuration.

4 Make any other required changes by clicking the appropriate tab and amending the entries.

5 Click the **Apply** button to implement the changes.

Deleting a channel

To delete a channel from the hierarchy:

1 Right-click the channel icon from the hierarchy in the left-hand pane of the **Overview** window and select **Delete Channel** from the option menu. This will display a warning message.

2 Click the **Yes** button to delete the channel.

Channel parameters

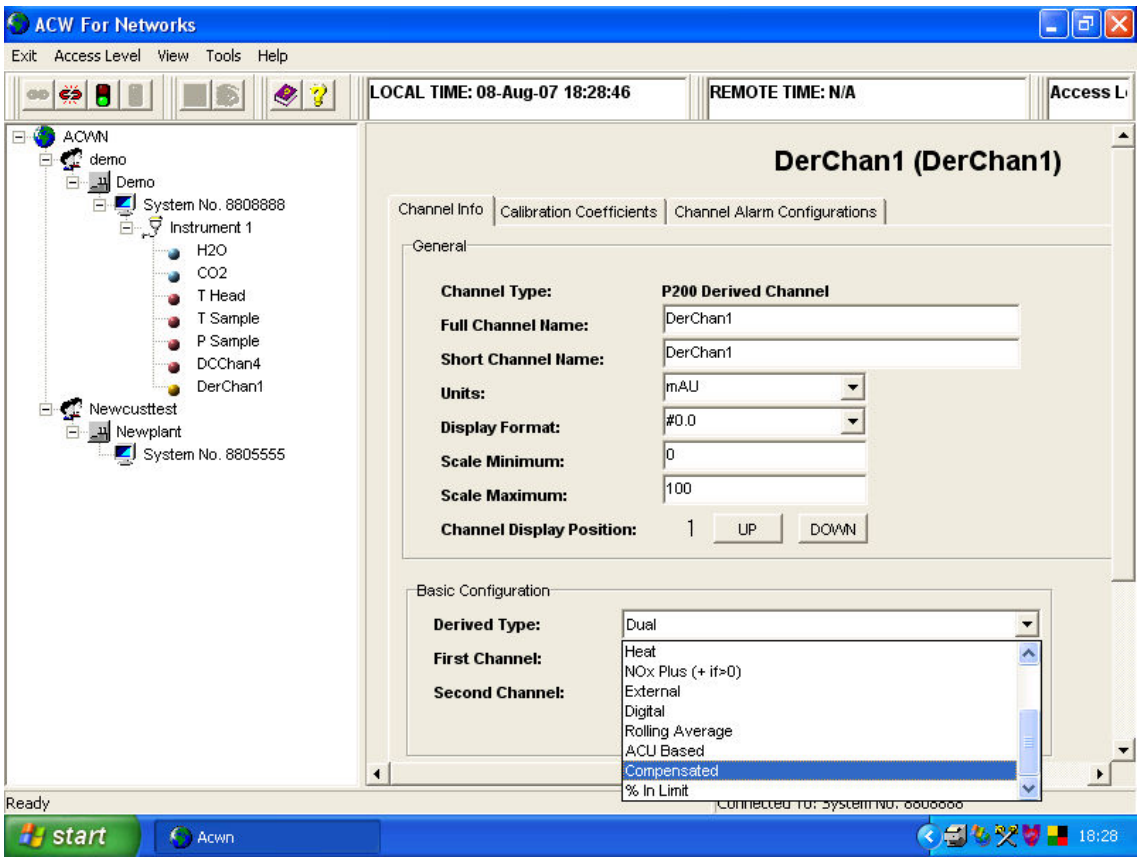
There are up to five tabs containing parameters for each channel:

- Channel Info.
- Calibration Coefficients.

- AutoZero Configuration.
- Cross Sensitivity.
- Channel Alarm Configurations.

Channel Info

The following information is contained in the **Channel Info** tab for all instrument types:



General	*you enter or see*
Channel Type	This display-only field shows type of optical head unit and channel.
Full Channel Name	You can enter the name of the channel. The default is derived from the system configuration.
Short Channel Name	You can enter a shortened name that will be recognised for the channel.
Units	You can select the units for the measurement made on the channel

General	*you enter or see*
Display Format	This shows the number of decimal places to which the measurements are displayed. This should not be adjusted to display a resolution significantly greater than the accuracy of the analyser. Typically 1 decimal point will be used for full scale sensitivities of 10 – 100 and 2 decimal points for full scale sensitivities of less than 10. Otherwise, no decimal points are included.
Scale Minimum	You can enter the lower calibration limit for the channel.
Scale Maximum	You can enter the upper calibration limit for the channel.
Channel Display Position	The number indicates the position of this channel in the hierarchy. You can change the channel's position using the arrow buttons.

In addition to this information, there are basic configuration parameters that are specific to channel types and instrument types handled by *ACWn*.

Measured channel information

Different instrument and measured channel combinations have different configuration parameters. Any subset of the following information and selections may be shown on the **Channel Info** tab for measured channels:

Basic Configuration	*you enter or see*
Measure Filter	For Pulsi x00 OHU's only. For each component, two signals are recorded; the upper reading is from a measure filter and the lower reading is from a reference filter. This shows the measure filter number. You can select a different filter from the drop-down list. The number of the filter used; for example, 1 indicates the first of up to eight filters on the filter wheel. Filters 0 and 9 are fixed references.
Reference Filter	For Pulsi x00 OHU's only. This shows the number of the filter used to record the lower reading for the channel. You can select a different filter from the drop-down list.
Gas Correlation	For Pulsi x00 OHU's only. For some gases it is possible significantly to reduce the effect of interfering components by the use of a gas cell and well matched filters. The use of this technique is described in the Operating Manuals for each PULSI head unit. Select this checkbox to apply gas correlation.

DC channel information

The following information will be shown on the **Channel Info** tab for DC channels:

you see	*you enter or see*
Reading Address	This shows the Modbus address that *ACWn* will read to retrieve data for this channel.

Derived channel information

Derived channels are channels that show information derived from two other channels. There are a number of algorithms that can be used to derive the channel values from the source information.

The following information will be shown on the **Channel Info** tab for derived channels:

you see	*you enter or see*
Derived Type	From this drop-down list you can select the method that will be used to derive information for this channel. This now includes compensated, % in limit and dual auto cal mode.
First Channel	From this list you can select the channel that will be used to supply the first set of values in the algorithm for the method used to derive the channel information.
Second Channel	From this list you can select the channel that will be used to supply the second set of values in the algorithm for the method used to derive the channel information.
Alarm	Not changeable while running, Selects the source for % in Limit.
Averaging Period	Not changeable while running. Selects period for Averaging from a list.
Value	Not changeable while running. Enter value selecting an ACUbased Channel

Relay channel information

Different instrument and relay channel combinations have different configuration parameters. Any subset of the following information and selections may be shown on the **Channel Info** tab for relay channels:

IOU/Basic Configuration	*you enter or see*
Relay Index	You can select the relay.
Inverted	Check this box if you want the relay to be normally close, then open on triggering.
Instrument	You can choose the instrument that will be monitored for alarm conditions that will trigger the relay. This list contains all the instruments defined for the system.

IOU/Basic Configuration	*you enter or see*
Trigger Alarm	From this drop-down list you can select the alarm that will trigger the relay.
Delay	You can enter a delay (in seconds) that will elapse after the alarm condition before the relay is triggered.

Transmitter channel information

The following information will be shown on the **Channel Info** tab for transmitter channels:

IOU/Basic configuration	*you enter or see*
Output Address	Transmitter module socket number
Instrument	Source Instrument
Channel	Source Channel
4mA Count	0 value bit count
20mA Count	Full Scale value bit count.
Frozen During Calibration	Check to freeze output during Autozero/Autocal.

Digital input channel information

The following information will be shown on the **Channel Info** tab for digital input channels:

IOU/Basic Configuration	*you enter or see*
Input Index	You can select the position of the relay within the list.
Inverted	Check this box if you want the relay to be normally close, then open on triggering.

Calibration Coefficients

Each type of channel has its own combination of calibration coefficients. The calibration coefficients for each head can be viewed. Access to most of the calibration coefficients is restricted to service engineers only.

WARNING

***ACWN* IS SUPPLIED PRE-CONFIGURED IN ACCORDANCE WITH THE CALIBRATION OF EACH OHU. SYSTEM SETTINGS SHOULD ONLY BE CHANGED FOR GOOD OPERATIONAL REASONS. EXPERIMENTING WITH SYSTEM SETTINGS MAY DISTURB THE PROPER FUNCTIONING OF THE SYSTEM.**

AutoZero Configuration

The following parameters are shown on the **AutoZero Configuration** tab:

you see	*you enter or see*
Air Offset	In some cases there can be a significant amount of one of the measured components in the zero gas supply, for example carbon dioxide. You can enter this level here so that the Autozero process can allow for this residual level.

you see	*you enter or see*
Zero Offset	Each infra red or ultra violet channel measurement has an offset value that is adjusted to give a zero reading in the absence of any measured component. This is adjusted automatically during Autozero, but you can enter a value here to give a positive offset during analyser testing in order to assess stability.
Cal Gas Bottle	You can select a cylinder number for calibration, or NONE.
Cal Gas Conc	You can enter the component concentration in the specified cylinder.

Cross Sensitivity

The cross-sensitivity parameters are set during the initial system calibration and must not be changed. Any amendments made after calibration may severely affect the performance of the instrument and your whole system.

Channel Alarm Configurations

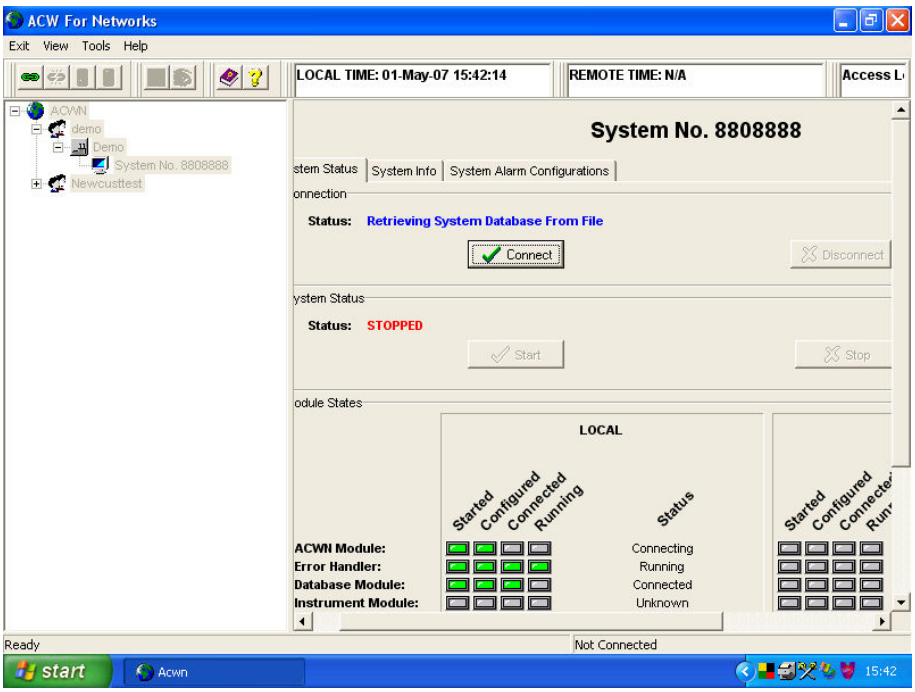
This tab displays the configuration details of each alarm defined for the selected channel. Note that none of these values can be changed, as they are entered during alarm configuration.

For more information please refer to the heading *Configuring alarms*.

Connecting and starting a system

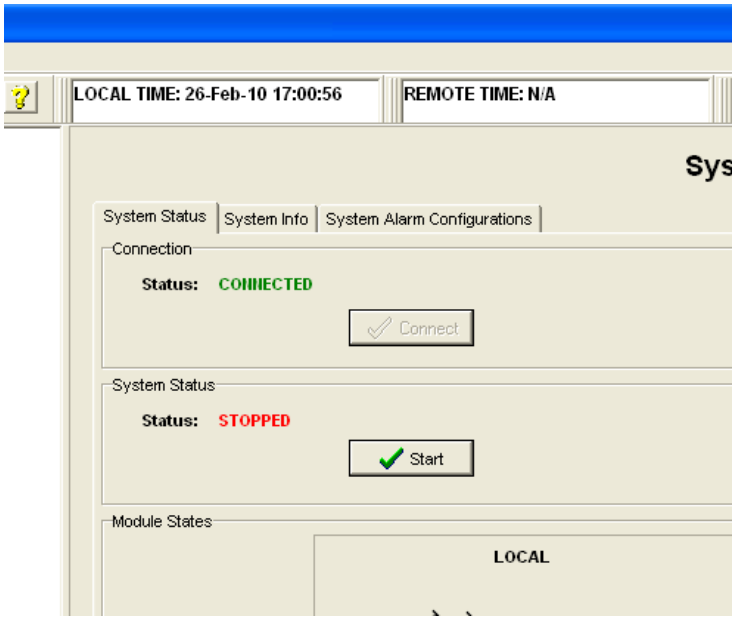
To view system status and configure alarms, you must first connect and start the system:

Either click the **Connect** button on the toolbar or select the **System Status** tab and click the **Connect** button in the **Connection** area. The **Status** line will show progress as the connection is made, and will show **CONNECTED** on completion.



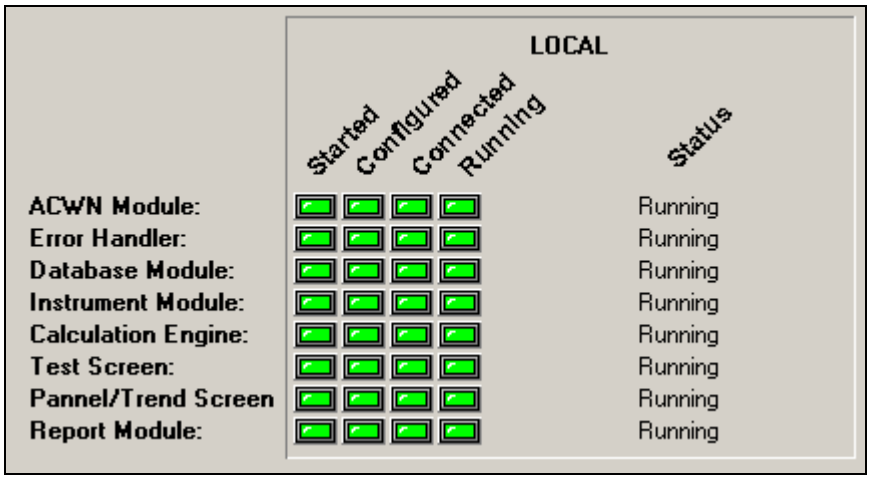
Either click the **Start** button on the toolbar or click the **Start** button in the **System Status** area. The **Status** line will show progress as the system starts, and will show **RUNNING** on completion. Note that you cannot start a system until it has been connected.

See Screenshot below.



Monitoring module status

The status of *ACWn* modules is displayed in the **System Status** tab:



If the application is run over a network, the module status is displayed for both the local and remote systems.

For each module there are four status indicators:

- Started.
- Configured.
- Connected.

- Running.

When that status is achieved, the marker goes green. If the status has not been achieved, the marker is grey. The current status is also given explicitly at the right-hand side.

Configuring alarms

You can configure alarms for any system, instrument or channel that is connected and started:

1 Select the appropriate item from the hierarchy in the left-hand pane of the **Overview** window.

2 Ensure that the system is connected but not running, then select the appropriate **Alarm Configurations** tab in the right-hand pane.

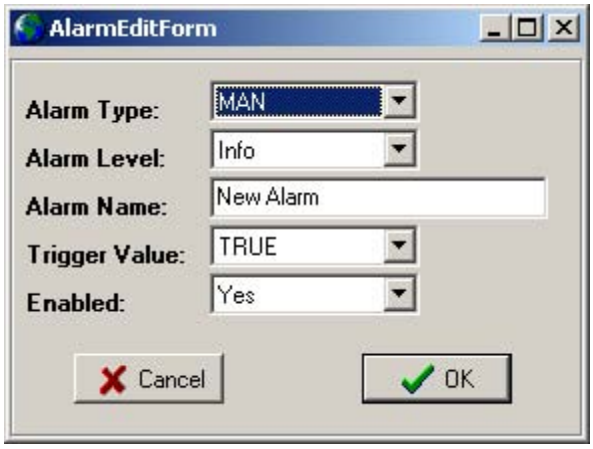
3 Perform the required configuration, which can be:

- Adding new alarms.
- Editing existing alarms.
- Deleting alarms.

Adding a new system alarm

To add a new alarm:

1 Click the **Add** button. This will display the **Alarm Edit Form** dialog containing default information:



2 Select the **Alarm Type** from the drop-down list, which shows all the types that apply to the selected item. The following table gives a full list of alarm codes and their meanings:

Type	*alarm*
OFF	No alarm set.
CLO	Measured value < LOW alarm.
CLL	Measured value < two LOW alarms.
CHI	Measured value > HIGH alarm.

Type	*alarm*
CHH	Measured value > two HIGH alarms.
CBO	Measured value either < LOW or >HIGH alarm.
SIG	Reference signal LOW.
CAL	Autocalibrate fault.
DUA	Dual channel range (OFF = LOW range ON = HIGH range).
CON	Head disconnected.
AUZ	Autozero in progress.
WHE	Filter wheel speed fault.

There are a further four alarms that are triggered by a combination of those alarms listed above:

Type	*alarm*
HUC	An alarm that includes all alarm sources of a head including measured value alarms.
HUN	An alarm that includes all alarm sources of a head but not including measured value alarms.
ANC	An alarm that includes all alarm sources of all heads including measured value alarms.
ANN	An alarm that includes all alarm sources of all heads but not including measured value alarms.

3 Select the required **Alarm Level** from the drop-down list, which contains the following:

type	*level*
Fault	Triggering of the alarm indicates that a fault condition has been detected.
Reading	Triggering of the alarm indicates that a reading has been taken.
Warning	Triggering of the alarm indicates that a warning has been generated.
Info	Triggering of the alarm indicates that there is information for the user.
Trigger	Triggering of the alarm indicates that a trigger value has been exceeded.

Note that some **Alarm Types** do not use all the levels. Only the applicable levels will be shown.

4 Enter a name for the alarm (free text up to 29 characters).

5 Select whether the **Trigger Value** is the normal (**TRUE**) condition or will cause the alarm to be triggered.

6 Select whether the alarm is normally enabled.

7 Click **OK** to create the alarm.

Editing an existing alarm

You can modify the details of an existing alarm:

1 From the hierarchy in the left-hand pane of the **Overview** window select the item to which the alarm relates. This will display the item's details in the right-hand pane.

2 Select the **Alarm Configurations** tab for the item to display the list of alarms for the item.

3 Select the alarm from the list within the tab and click the **Edit** button. This will display the **Alarm Edit Form** dialog showing details of the alarm.

4 Make the required changes to the alarm configuration.

5 Click the **OK** button to implement the changes.

Deleting an alarm

You can delete any custom alarms created for an item. Note that some of the alarms created when the item was first defined cannot be deleted. If you try to delete one of these alarms, a message will be displayed to tell you that the alarm cannot be deleted.

To delete an alarm:

1 From the hierarchy in the left-hand pane of the **Overview** window select the item to which the alarm relates. This will display the item's details in the right-hand pane.

2 Select the **Alarm Configurations** tab for the item to display the list of alarms for the item.

3 Select the alarm from the list within the tab and click the **Delete** button. The alarm will be deleted with no warning.

NOTE: MANUAL ALARMS WILL OPERATE EVEN WHEN INSTRUMENT IS DISABLED.

Stopping and disconnecting a system

You can stop and disconnect a system at any time:

1 Either click the **Stop** button on the toolbar or ensure that the **System Status** tab is selected and click the **Stop** button in the **System Status** area. This will display a warning.

2 Click the **Yes** button. The **Status** line will show progress as the system shuts down, and will show **STOPPED** on completion.

3 Click the **Disconnect** button, either in the **Connection** area or on the toolbar. The **Status** line will show progress as the connection is broken, and will show **DISCONNECTED** on completion. Note that you cannot disconnect a system until it has been stopped.

5 Viewing Panels

This section describes how you can use the **Panel** window to monitor the values recorded by the optical head units. You can select a specific panel from the **Panel/Trend Screen**.

The following topics are covered in this section of the manual:

- Opening a Panel.
- About the Panel display.
- Customising the Panels.

You can display the **Panel/Trend Screen** from the **Overview** window by either clicking the **Panels/Trends Screen** button on the toolbar or choosing the **Panels/Trends** option from the **View** menu.

Opening a Panel

Analyser Control for Windows for Networks has a separate **Panel** window pre-configured for each connected optical head.

You can open a specific **Panel** window from:

- Any other **Panel** or **Trend** window.
- The **Test** window.

From any Panel or Trend window

To open a **Panel** window, either:

- Open the **Panel** menu and select the appropriate **Head** option.
- Click on the appropriate **Panel** button on the toolbar.

Note
When a **Panel** window is displayed, the head it describes is easily identified as the **Panel** button appears greyed out the toolbar.

From the Test window

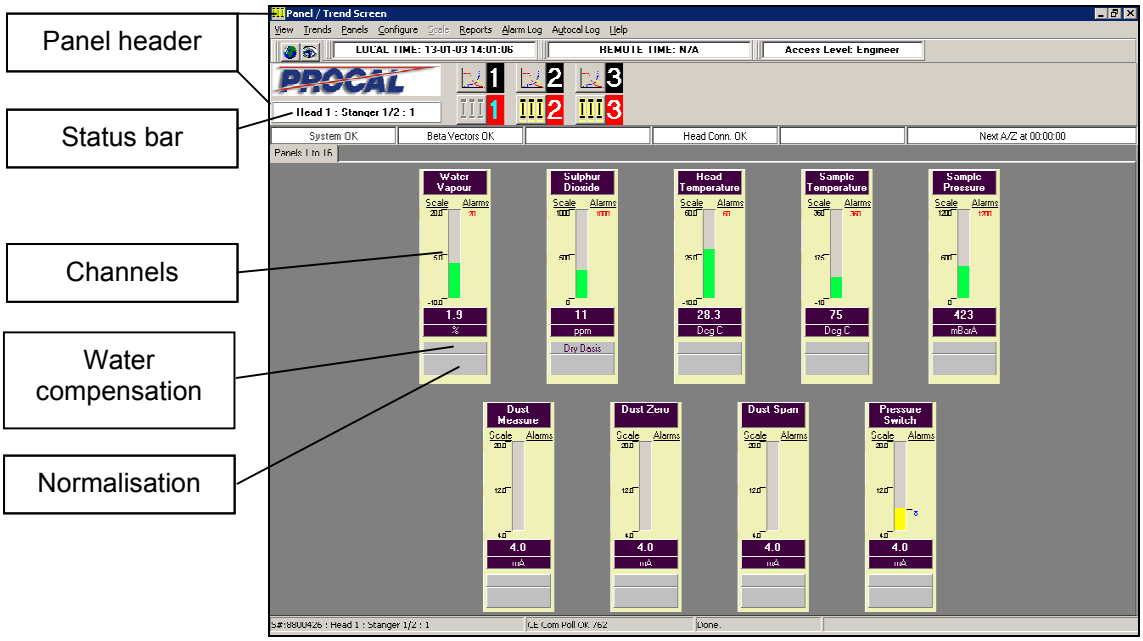
To open a **Panel** window, from the **Test** window:

1. Either click the **Panel/Trend** button on the toolbar or select **Panel/Trend** from the **View** menu. The **Panel** or **Trend** window that was last viewed will be displayed.
2. If the **Trend** window is displayed, either:
   - Open the **Panel** menu and select the appropriate **Head** option.
   - Click on the appropriate **Panel** button on the toolbar.

Note
Trend windows can display channels from any OHU connected to the system. When a **Trend** window is displayed, the head it describes is easily identified as the **Trend** button appears greyed out on the toolbar.

About the Panel display

The following illustration shows a typical Panel display:



Panel header

The currently displayed head is given in the Panel header and is indicated on the toolbar by the Panel selection button being a different colour than the rest.

Status bar

The status bar, which is positioned below the header, shows details of system and instrument conditions:

you see	*what it means*
System	*System OK* — All heads are functioning normally. *System Fault* — There is either a Filter Wheel or Optical Signal fault on one of the heads. This can be ascertained by selecting each of the heads in turn until the one showing one of those faults appears. A quicker diagnosis is provided by taking the mouse pointer to this status box and double-clicking on it. This will bring up an information box containing the current alarms contributing to that System fault.
Filter Wheel	This box will only be active if the head is a PULSI Px00 head. *Filter Wheel OK* — The filter wheel motor is functioning normally. *Filter Wheel Slow* — The motor is faulty.

you see	*what it means*
Optical Signal	This box will only be active if the head is a PULSI Px00 or P5000 head. *Optical Signal OK* — There is sufficient light available. *Optical Signal LOW* — Insufficient light available.
Head Connection	*Head Connection OK* — The head RS485 data connection is functioning normally. *Head Connection Fault* — A fault exists on the head connection such that no data communication can take place.
Drive Status	*Drive OK* – Drive ready with sufficient free space. *Drive Low* – Drive ready with insufficient free space. *Drive Not Available* – Drive not ready. *Drive Not Present* – Drive does not exist.
Autozero	This box reflects the current state of the Autozero function and is not active if the head is an Auxiliary Input Unit The possible states are: *Autozero - OFF* *Autozero - pending* — The head is awaiting a timed, automatic, autozero. *Autozero - zero purge* — Autozero has started and is purging gas from the sample cell. *Autozero - zero measure* — The head is averaging the data with no sample gas present. *Autozero - zero update* — The head is calibrating the zero datum for each channel. *Autozero - process purge* — The head has completed the autozero task and is re-admitting process gas to the sample cell This box will also display the following text relating to other functions and conditions related to Autozero: *Safety purge on* — If the sample cell temperature is below a preset level then a safety air purge will be automatically switched on to prevent acidic sample gas from condensing inside the instrument sample cell, thereby causing rapid corrosion. *Manual purge on* — The user can select this air purge for various diagnostic purposes.

Channels

Up to 16 channels can be displayed on a panel screen. If more than 16 channels are selected, tabs will be displayed showing 16 channels on each tab. Each channel is presented in an individual front panel type mimic showing information for the channel.

you see	***what it means***
Measured component	The name of the component being measured on the channel.
Measured value	The measured value for each channel is given qualitatively as a ribbon gauge. The colour or the ribbon gauge indicates the alarm status of the channel. *Green* — No alarm is active *Yellow* — Low alarm is active *Yellow flashing* — low alarm active, measured value is off the scale. *Red* — High alarm is active
Scale	This is set during configuration of the channel, and shows the range over which readings will be displayed on the bar for this channel.
Alarms	This shows whether an alarm condition exists for this channel.
Measured value	The measured value for each channel is given quantitatively.
Measured units	This shows the units in which the measured value is displayed.

Water compensation

This will tell you if the displayed values have been adjusted for water vapour content.
Wet basis — No adjustment has been made.
Dry basis — Value has been adjusted.

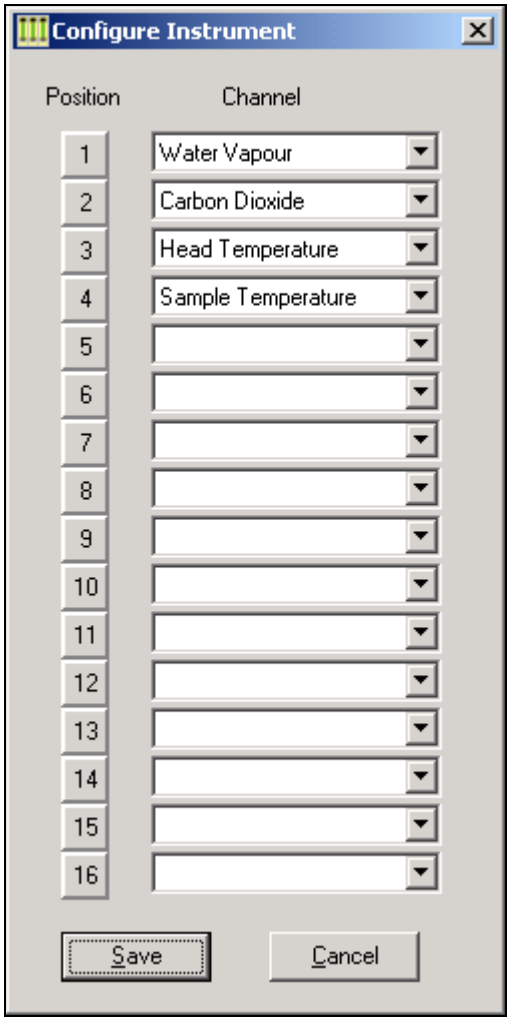
Normalisation

This shows the diluent correction (if appropriate) for the presence of carbon dioxide or oxygen.

Customising the panel

Each **Panel** window will display a factory preset arrangement of the channels. The order, and components monitored on the channels can be changed to suit your own requirements:

1 Display the **Panel** for the instrument to be reconfigured then select **Configure** from the menu bar. This will display the **Configure Instrument** dialog showing the current allocation of channels for the instrument.



Note
If there are more than 16 channels, tabs will be displayed in the dialog with 16 channels on each tab.

2 Click on the down arrow alongside the channel position you wish to change and select the component you want to be displayed The drop-down list will disappear and your chosen component will be displayed in the channel box. Each component can be allocated to only one channel on each instrument.

3 Continue to do this, selecting each channel in turn until you have configured as many of the channels as you want components to be displayed.

Note
Any channels with no entry in this dialog are left un-configured. Only configured channels will be displayed on the **Panel** window.

4 When your configuration is complete, click the **Save** button. The **Panel** window will refresh and display the components you have selected.

6 Viewing Trends

This section describes how you can use the **Trend** windows to view historical recorded levels monitored by the optical head units. You can select a specific trend from the **Panel/Trend Screen**.

The following topics are covered in this section of the manual:

- Opening a **Trend** window.
- About the **Trend** display.
- Customising a **Trend** window.
- Printing a **Trend** chart.
- Adding a new **Trend**.

You can display the **Panel/Trend Screen** from the **Overview** window by either clicking the **Panels/Trends Screen** button on the toolbar or choosing the **Panels/Trends** option from the **View** menu.

Opening a Trend window

Analyser Control for Windows for Networks is supplied with a separate **Trend** window pre-configured for each connected optical head.

You can open a specific **Trend** window from:

- Any other **Panel** or **Trend** window.
- The **Test** window.

From any Panel or Trend window

To open a **Trend** window, either:

- Open the **Trend** menu and select the appropriate Trend number. Trends are numbered for convenience as any Trend can have a selection of channels from a mix of instruments.
- Click the appropriate **Trend** button on the toolbar.

Note
When a **Trend** window is displayed, its number is easily identified as the **Trend** button appears greyed out on the toolbar.

From the Test window

To open a **Trend** window, from the **Test** window:

1. Either select the **Panel/Trend** option in the **View** menu or click the **Panels/Trends screen** button on the toolbar. The **Trend** or **Panel** window (depending on which was last viewed) for the active **Head Data** window will be displayed.

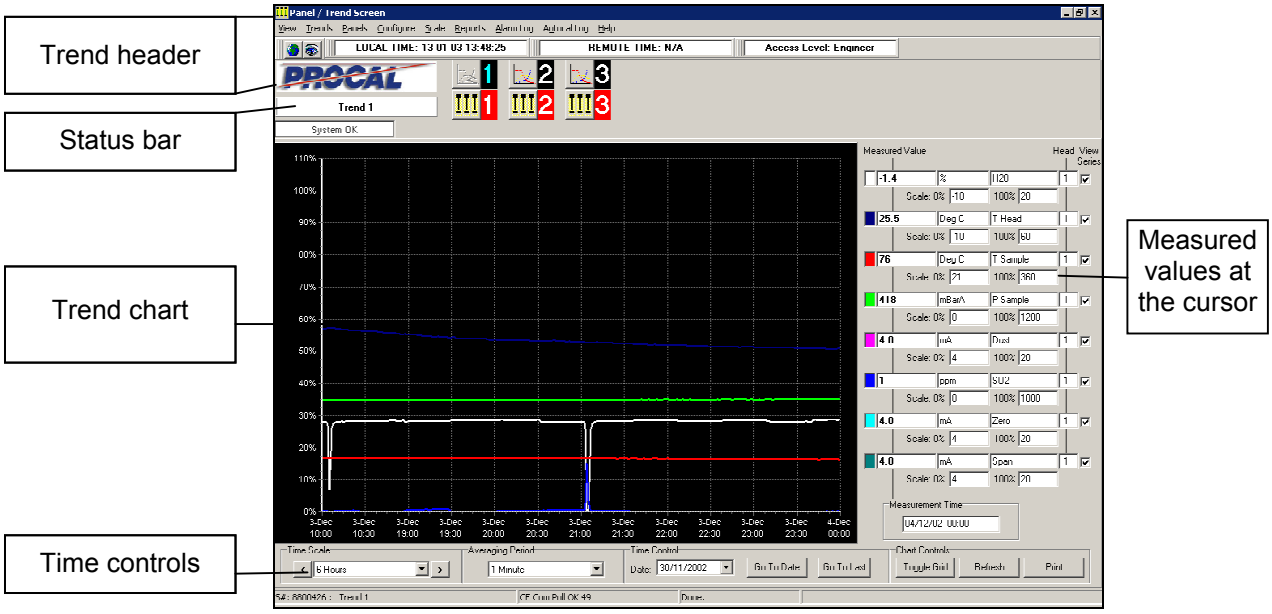
2 If the **Panel** window is displayed, either:

- Open the **Trend** menu and select the appropriate Trend number.
- Click the appropriate **Trend** button on the toolbar.

Note
When a **Trend** window is displayed, its number is easily identified as the Trend button appears greyed out on the toolbar.

About the Trend display

The following illustration shows a typical Trend display:



Trend header

The currently displayed Trend number is given in the Trend header and is indicated on the toolbar by the Trend selection button being a different colour from the other buttons.

Status Bar

The status bar, which is positioned below the header, shows details of system conditions:

System OK — No problems exist on the system.
System Fault — There is either a Filter Wheel or Optical Signal fault on one of the heads. This can be ascertained by selecting the **Panel** window on each of the heads in turn until the one showing one of those faults appears. A quicker diagnosis is provided by taking the mouse pointer to this status box and double-clicking on it. This will bring up an information box containing the current alarms contributing to that system fault.

Trend chart

Up to eight channels can be displayed on the **Trend** chart. Each channel is presented as a user-selectable coloured line.

you see	*what it means*
Percentage scale	The values plotted on the chart are displayed as percentage values of full scale on a given range. The range is different for each channel and the maximum and minimum values are given in the Scale boxes.
Scale boxes	These figures represent the upper and lower limit on which the percentage scale of the chart is based. Values are colour coded to match the trace on the chart and entries on the table
Timescale	The timescale is given on the lower axis of the **Trend** chart.
Cursor	The vertical, white cursor marks the position of readings displayed in the measurement table at the date and time given in the Measurement Time box.

Time Controls

Below the **Trend** chart and the measurement table are several control features which can be used to view the displayed data over time:

you see	*what it means*
Time Scale	The drop-down list allows you to select the time range for the displayed area of the Trend chart. The available options are: 6 hours, 24 hours, 7 days, 31 days, 1 year The arrows at the ends of the box allow you to step backward and forward through the trend data. Clicking an arrow moves you through the data in steps of the selected time scale magnitude.
Averaging period	Readings are recorded in the data log every thirty seconds. This drop-down list allows you to select a time period over which the plotted values will be averaged. The available options are: 1 minute, 5 minutes, 15 minutes, 30 minutes, 1 hour, 4 hours, 12 hours, 24 hours. The actual options on the list depend on the **Time Scale** selection.
Date	You can select a date for which you want to view trend data.
Go To Date	Clicking this button will display the trend data for the date selected in the **Date** field.
Go To Last	Clicking on this button returns the displayed area of the chart and the cursor to the present time.
Toggle Grid	Clicking this button will toggle the grid on the trend chart between visible and invisible.
Refresh	Clicking this button will redraw the current chart to include the most recent data.
Print	Clicking this button will print the portion of the **Trend** chart currently displayed.
Measurement Time	This gives the exact time of the readings given in the measurement table. The readings correspond with those on the **Trend** chart at the position of the cursor.

Measured values at the cursor

The table to the right of the Trend chart identifies each measured component and its value at the time shown in the **Measurement Time** field.

you see	*what it means*
Coloured bar	This coloured sample indicates the colour of the corresponding trace on the Trend chart.
Measured Value	A measured value for each channel is given quantitatively as a digital reading. The value shown is specific to the date and time given in the **Measurement Time** field. It corresponds to the value given on the Trend chart at the position of the cursor.
Measured units	This shows the units in which the measurement is being displayed.
Measured component	This gives the name of the component being measured.
Head	This indicates the number of the head that is measuring the component.
View Series	Select this checkbox to display a trace in the trend chart for this component.
0%	The value in this field shows the actual value of the component when the trace shows 0%
100%	The value in this field shows the actual value of the component when the trace shows 100%

Customising a Trend

When *ACWn* is dispatched, a **Trend** window will normally be pre-configured to display the default arrangement of traces for each of the connected optical heads or auxiliary input units. You can customise any **Trend** window to record components of your choice from any optical head or auxiliary input unit.

Any changes to a **Trend** window's configuration will not be reflected in its partner **Panel** window, nor will the changes affect the configuration of any other **Trend** window.

Note
It is recommended that to avoid confusion **Trend 1** should display the same information as **Head 1** and so on, as supplied. However , additional **Trend** windows can be configured. These can be used to display components measured by different heads on the same Trend. Details on how to create a new **Trend** window are given later in this section under the heading *Adding a new Trend.*

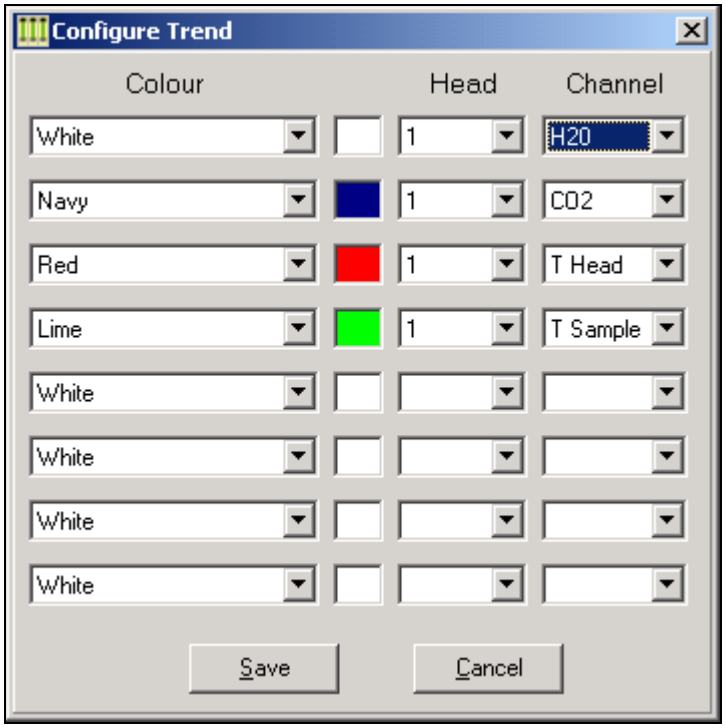
Customising a **Trend** window can involve any of the following:

- Changing the components shown on the **Trend** window.
- Changing the timescale on the chart.
- Changing the averaging period of the chart.
- Viewing different areas of the chart.
- Showing and hiding components.
- Showing and hiding the chart grid.
- Refreshing Trend data.
- Changing the scaling of individual components.

Changing the components shown on the Trend window

When *ACWn* is dispatched, each **Trend** window will display the default arrangement of component traces. The order, and components displayed on these traces can be configured to your own requirements:

1 From the **Configure** menu select the trend to be reconfigured. This will display the **Configure Trend** dialog showing the current configuration of the traces shown on the chart:



2 Click the down arrow alongside the channel you wish to change, and then select the component you want to be displayed.

3 Continue to do this with each channel in turn until you have selected as many of the components as you want to be displayed, then click the **Save** button. The **Trend** window will refresh and display the data for the components you have selected.

Note
When you configure channels, if you need to delete selecting the blank area above Head 1 on the Head pull down list deselects the channel. Only configured channels will be displayed on the **Trend** window.

ACWn accepts gaps. Blanks are automatically moved to the end of the list when saved.

Changing the timescale on the chart

The default timescale for the visible area of the component traces is 6 hours. If required the timescale can be adjusted to show the previous 24 hours, 7 days, 31 days or 1 year of data. This can be particularly useful when assessing data qualitatively.

To change the timescale used on the chart:

1 Click the down arrow in the **Timescale** box. A drop-down list of time options will appear.

2 Select the timescale you want to be use on the chart.

The drop-down box will close and the **Trend** window will refresh to show your selected data.

Changing the averaging time of the chart

The default averaging time for the component traces is different for each timescale:

- 6hrs: 1 minute.
- 24hrs: 5 minutes.
- 7 days: 30 minutes.
- 31 days: 4 hours.
- 1 year: 24 hours.

On each timescale this is the minimum averaging time that can be set. If required the averaging time can be changed. Increasing the averaging time will result in a smoothing of the traces on the chart.

To change the averaging time used on the chart:

1 Click the down arrow in the **Averaging Time** box. A drop-down list of time options will appear.

2 Select the averaging time you want to use to plot the traces on the chart.

The drop-down box will close and the **Trend** window will refresh to show the traces produced using your chosen averaging time.

Viewing different areas of the chart

The table on the **Trend** window gives specific measurements of all components at the position of the chart cursor. The default position of the chart cursor is at the right hand side of the chart and denotes current time.

The cursor can be moved to any time on the chart. This can be done in a number of ways:

- Clicking the mouse to position the chart cursor.
- Using the Left and right ARROW keys to move the chart cursor.
- Displaying trends for a specified day.
- Displaying the most recent data.

Using the mouse to position the chart cursor

This is probably the easiest way to interrogate a specific point on the chart.

Click any point within the displayed chart area. The chart cursor will move to the selected position, the time at that point will be shown in the **Measurement Time** field and you can read the measured values for all components at that time.

If you want to go back, or forward, further than the time span of the displayed chart then you should click the appropriate arrow symbol either side of the **Time Scale** selection control. In each case the time period regresses or advances by the length of the timescale chosen.

Using the ARROW keys to position the chart cursor

This is the easiest way to scroll back through the time, viewing the traces as you go.

The left and right ARROW keys on the keyboard will move the chart cursor to the left and right in time steps equal to the defined **Averaging Period**. The measured values of the components will refresh as the cursor moves.

Displaying trends for a specified day

You can view a Trend chart for a specified day:

1 Enter the date you want to view into the **Date** field of the **Time Control** area. Alternatively, click the arrow button at the right-hand end of the field to display a calendar, then select the day.

3 Click the **Go To Date** button to move the Trend display to the beginning of the chosen date. The selected date and time will be shown in the Trend display will be shown in the **Measurement Time** field and the measurement values for the time will be displayed.

Displaying the most recent data

To display the most recent data on the Trend chart click the **Go To Last** button. The time of the last measurement will be shown in the **Measurement Time** field and the most recent measurement values will be displayed.

Showing and hiding components

You can choose which component series will be shown on the Trend chart. To hide a series, clear the **View Series** checkbox for that component. To display a series, ensure that the **View Series** checkbox is selected.

By default, all series are selected for display.

Showing and hiding the chart grid

You can show or hide the background grid of the Trend chart by clicking the **Toggle Grid** button.

Refreshing Trend data

You can force the Trend chart to retrieve the latest data from components by clicking the **Refresh** button. The chart will then display the most recent data.

Changing the scaling of individual components

The default values for the span of each component results on the zero and maximum measurements to be used for the bottom and top of the **Trend** chart.

If required, you can change the default scaling, thereby moving the trace relative to those around it In this way, two traces that fall on top of each other can be moved apart. In doing so you may increase the sensitivity of the trace. Note, however, that the accuracy of each measured channel is still ±2% of the original span value.

To change the scaling of a component on the **Trend** chart:

1 Click the **Scaling** menu. A menu listing all the currently configured channels will open.

2 Select the channel (head and component) you want to re-configure. The **Scale** dialog will be displayed:

The colour of the trace of the channel is given at the top of the window. If this does not match the channel you want to adjust, click **Cancel** and start the procedure again.

3 The current scaling is given by the figures in the **Minimum** and **Maximum** boxes. Enter your new scale in these boxes. You can either type the numbers directly into the boxes or use the sliding bars to select a value.

4 Click the **Apply** button. The **Adjust Trend Scaling** window will remain open but your new scaling for your selected channel will be applied to the chart to enable you to evaluate its effect.

5 If the new scaling is acceptable, click **OK**. The **Scale** dialog will close and your new scale will remain on the chart.

If the new scaling is not correct, you can repeat steps 3and 4 as often as required.

If you want to revert to the previous scaling, click **Cancel**. The **Scale** dialog will close and the Trend chart will display the previous scaling for the selected channel.

If you want to restore the default scaling for the selected channel, click the **Default** button. The **Scale** dialog will close and the default scaling will be used.

Printing a Trend chart

You can print the displayed section of a Trend chart at any time by clicking the **Print** button. The chart will be printed on the computer's default printer using its standard configuration.

The print will show:

- The actual chart, with its visible traces.
- The instrument names.
- Measured values.
- Units.
- Scale values.
- Measurement time and date.
- Averaging period.

Adding a new Trend

ACWn allows you to create your own **Trend** windows. You can use these new windows, for example, to compare measurements of components from different heads.

To create a new **Trend** window:

1 Open the **Trends** menu and select the **New** option. This will create a new **Trend** window with a **New Trend** dialog box already open.

2 Click the down arrow alongside the first **Head** box. A drop-down list of all the available optical heads and analog input units will be displayed.

3 Select the head unit required. The drop-down list will close and your selected head will appear in the first **Head** box.

4 Click the down arrow alongside the first **Channel** box. A drop-down list of components will appear.

5 Select the component you want to be displayed as the first trace. The drop-down list will disappear and you chosen component will be displayed in the first **Channel** box.

6 Repeat this procedure for each **Head** and **Channel** box in turn, until you have selected as many of the components as you want to be displayed.

7 Click **Save**. The **New Trend** dialog box will close and your new **Trend** window will be displayed. A new **Trend** button will also appear on the toolbar.

7 Viewing data and calibration

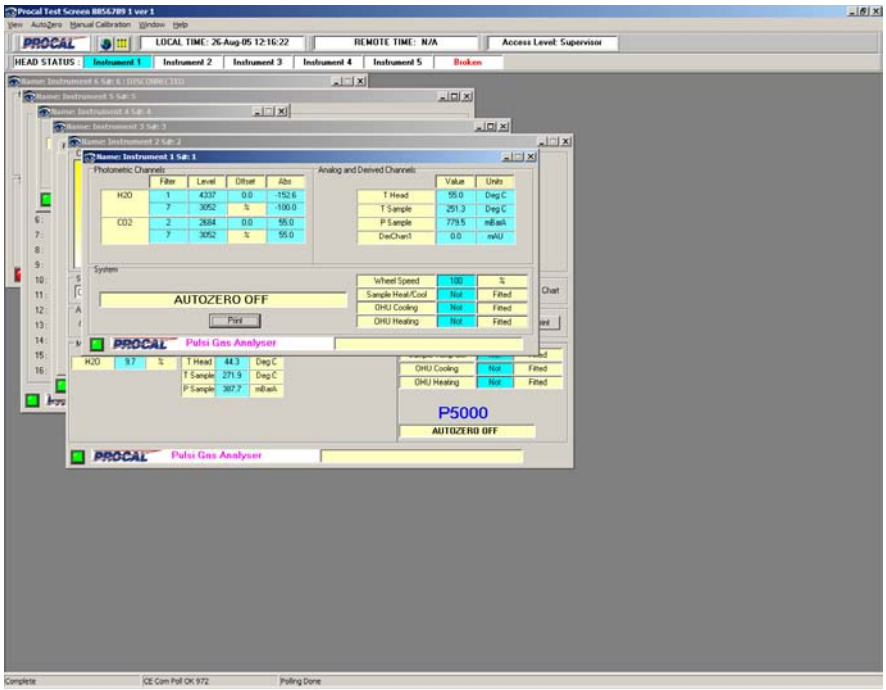
This section describes the information given in the **Data Windows** in the **Test** window, and describes routine calibration procedures.

The following topics are covered in this section of the manual:

- Viewing test data.
- About the test data.
- Viewing alarm logs.
- Manually starting an auto zero.
- Manual air purge.
- Manual calibration of gases.
- Manual calibration of analogue inputs.

Viewing test data

The **Test** window can be opened from any **Panel** or **Trend** window or from the **Overview** window. To do this, either select **Test** from the **View** menu or click the **Test Screen** button on the toolbar. The **Test** window will open:



The **Test** window, consists of a set of **Data Windows**. There is a separate **Data Window** for each of the optical head units and analogue input devices configured in *ACWn*.

Any menu items that are called from the **Test** window will be applied to the optical head unit or analogue input device for the active **Data Window**. The currently active **Data Window** can be identified in two ways:

- The table header is displayed in the highlight colour appropriate to your chosen Windows colour scheme.
- The head selection button on the status/toolbar is displayed as a reverse image and so is different than the others.

To make a different **Data Window** active, either:

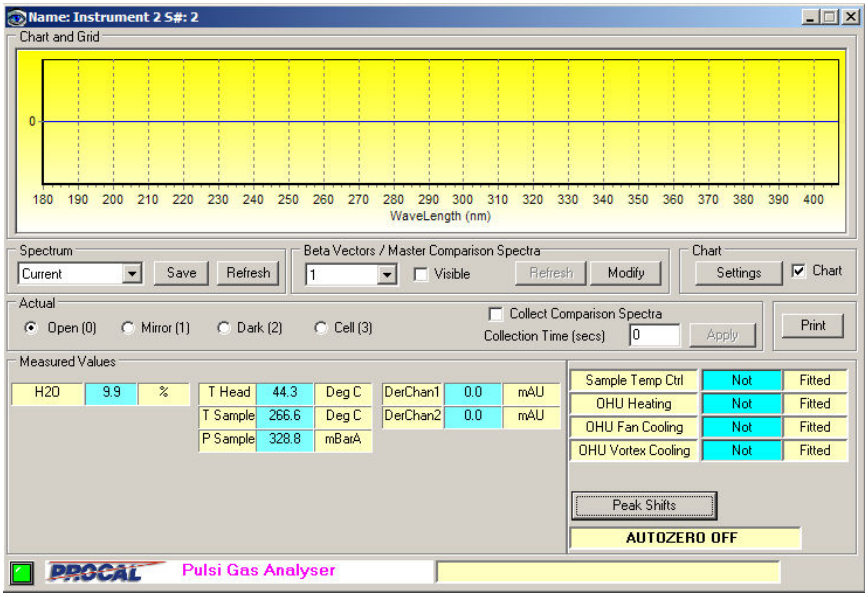
- Click anywhere on the appropriate **Data Window**.
- Click the appropriate selection button on the **Test** window's status/toolbar.

About the test data

The data given in a **Data Window** is dependent on the type of head unit and its configuration. The title bar of each data window identifies the instrument to which the data applies and its current connection status.

Note
Entries in the **Data Windows** are colour coded. Any value that falls outside the configured acceptable range will be displayed with a RED background. Acceptable values are displayed with a BLUE background.

PULSI optical head units from the P5000 series will have a **Data Window** that includes spectral information, similar to the one shown below:



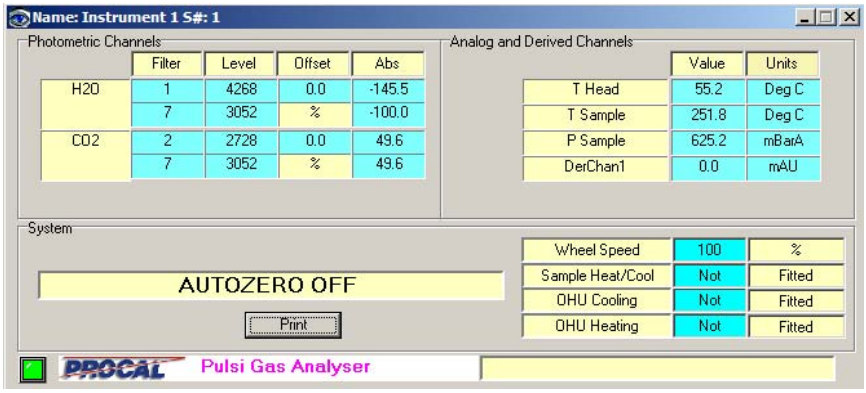
The significance of this data is shown in the following table:

entry	*what it means*
Chart and Grid	This area displays the chart (as shown in the illustration) or presents instrument data in a table.
Chart	When selected, this checkbox displays data in a chart. When cleared, data is shown in a table grid.

entry	*what it means*
Spectrum	The displayed spectrum can be selected from the buttons below the spectrum display. Selection of a button initiates a spectrum download. *Current* – the spectrum currently being measured minus the stored dark level. *Mirror* – the stored mirror spectrum level.*Dark* – the stored dark level. *Reference* – the stored reference spectrum level. *Abs* – the calculated absolute value for the currently measured spectrum. High abs value equates to high absorption, zero level indicates no absorption. *Bn* – internal intermediate reference spectrum. *Sn* – internal intermediate current spectrum. *Comparison* -
Save	Click this button to save spectrum data as Current.txt, Dark.txt, Reference.txt and Absolute.txt in the directory C:\Program Files\Procal Analyser Control.
Refresh	Click this button to initiate the download of the selected spectrum.
Beta Vectors/Master Comparison Spectra	This indicates progress of the Beta Vector upload to the OHU. You can select the set number (usually 1), choose whether to make it visible and refresh the spectra.
Modify	Accesses the Beta Vector Configuration Menu.
Actual	This allows you to select the CalSpec position, from **Open**, **Mirror**, **Dark** and **Filter**. These settings are used in conjunction with the P5000 internal calibration unit. *Open* – Measure Sample Cell. *Mirror* – Measure Mirror reflection. *Dark* – Measure Dark shutter. *Cell* – Measure Sample Cell with internal filter added. Note that during automatic sequences, the button indicated as selected will indicate that sequence is in progress. During manual operation the Status Panel will show the position achieved, apart from in Open when the normal status message will re-appear.
Collect Comparison Spectra	For Procal Calibration staff use only
Collection Time	This allows you to specify the time over which to collect Comparison data, there is a button to apply any change to the Collection Time.
Print	Clicking this button will print a copy of the displayed **Data Window**.
Measured Values	This area shows the actual data values measured for the channels of the selected instrument. The actual channels will represent the channels defined for the instrument, but some are present by default.

entry	*what it means*
T Head	Temperature of the head unit. To achieve accurate and reliable measurements, it is important that the optical head unit remains within a defined temperature range. Within this range, the analyser is fully compensated for variations in temperature. The permissible internal temperature range for a PULSI optical head unit is –10°C to 55°C (14°F to 131°F).
T Sample	Temperature in the sample cell. Again, it is important that the sample remains within a defined temperature range. Within the range, the analyser is fully compensated for variations in sample temperature. The permissible temperature range for the sample cell is application-dependent, but is typically ±50°C of the nominal calibration temperature.
P Sample	The pressure within the sample cell. Again, it is important that the analyser can fully compensated for variations in sample pressure.
Sample Temp Ctrl	
OHU Fan Cooling	In some applications a head Fan cooler is fitted and this indicates the current level of Fan cooling being applied. Cooling for wide variation of environments can be controlled.
OHU Heating	In some applications a head heater is fitted and this indicates the current level of heating being applied. Heating for wide variation of environments can be controlled.
OHU Vortex Cooling	In some applications a Head Vortex cooler is fitted and this indicates the current level of Vortex cooling being applied. Cooling for a wide variation of environments can be controlled. A status field indicates the current OHU status. Options are: *No reply from head* — Connection to the head is broken *Safety purge on* — If the sample cell temperature is below a preset level then a safety air purge will be automatically switched on to prevent acidic sample gas from condensing inside the instrument sample cell, thereby causing rapid corrosion. *Manual purge on* — The user can select this air purge for various diagnostic purposes.
Peak Shifts	

A PULSI 200 optical head unit will have a **Data Window** that will resemble the following:



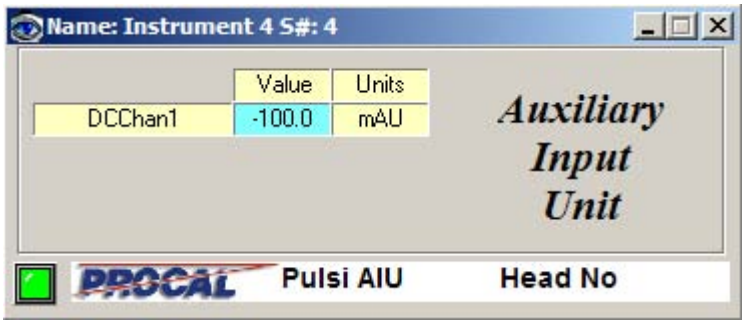
The significance of this data is shown in the following table:

Entry	*what it means*
Photometric Channels	This area shows data received directly from the OHU, and the actual channels will represent the channels defined for the instrument.
Filter	This shows the number of the filter used; for example, 1 indicates the first of up to 8 filters on the filter wheel. Filters 0 and 9 are fixed references. If a G is shown after the filter number, this indicates that a gas correlation cell is fitted with that filter. For a full explanation please refer to the manual supplied for that particular OHU.
Level	For each component, two signals are recorded; the upper reading is from the 'measure' filter and the lower reading is from the 'reference' filter. The optical signal strength through each filter is recorded by the detector, and is given in this column. A typical count of 5000 is equivalent to 5V amplitude at the A-D Converter. The higher the absorbance, the lower the measured signal. This signal is updated approximately every 1 to 2 seconds. Signal strength figures are relevant when calibrating the analyser and in diagnosing faults by reference to the figures obtained in the factory or from earlier field readings.
Offset	To correct for fixed differences in the filters' optical transmission, an offset value is applied to the measured signal to bring the indicated value for the component within the correct range. The Offset value is adjusted automatically during Autozero. It should only be adjusted manually for test purposes. Below each offset is the units used for this component.

Entry	*what it means*
Abs	The values displayed in this column, on the upper row, are in milliabsorbance units (mAU) and represent the basic photometric measurements. ABS values are only used for diagnostic purposes, and will not always correlate with the measured values shown on the MAIN screen. See the section in the appropriate OHU Operating Manual entitled *Technical description* for a fuller explanation. The value shown on the row below this, alongside the units in the offset column, is the concentration of that gas, repeating the information displayed on the **Panel** window.
Analog and Derived Channels	This area shows data received on analog channels and also channels derived from other channels. The actual channels will represent the channels defined for the instrument, but some are present by default.
T Head	Temperature of the head unit. To achieve accurate and reliable measurements, it is important that the optical head unit remains within a defined temperature range. Within this range, the analyser is fully compensated for variations in temperature. The permissible internal temperature range for a PULSI optical head unit is -10°C to 55°C (14°F to 131°F).
T Sample	Temperature in the sample cell. Again, it is important that the sample remains within a defined temperature range. Within the range, the analyser is fully compensated for variations in sample temperature. The permissible temperature range for the sample cell is application-dependent, but is typically ±50°C of the nominal calibration temperature.
P Sample	The pressure within the sample cell. Again, it is important that the analyser can fully compensated for variations in sample pressure.
System	This area shows general data about the system.
Wheel Speed	A figure representing the quality of the data received from the optical head unit. This will normally show 100, but if the filter wheel speed is not constant it will show a lower figure. Readings appearing on the **Panel** window and **Data Window** will be largely unaffected by a figure in the range 60 to 100, but readings below 90% would indicate an incipient problem with the filter wheel motor. In this case the problem should be investigated and remedied. If the figure is less than 50, the readings should not be considered accurate and you should contact Procal Analytics or your local agent.
Sample Heat/Cool	If a heater is associated with the OHU, for example a cell heater on P400 or an In-situ heater (ISH) on a P200LR or P5000, the current power level of the heater is shown. If a Cooling Probe is fitted (ISC) the current power level to the cooling fan is shown.
OHU Cooling	In some applications a head cooler is fitted and this indicates the current level of cooling being applied. Cooling for wide variation environments can be controlled.

Entry	*what it means*
OHU Heating	In some applications a head heater is fitted and this indicates the current level of heating being applied. Heating for wide variation environments can be controlled.
Print	

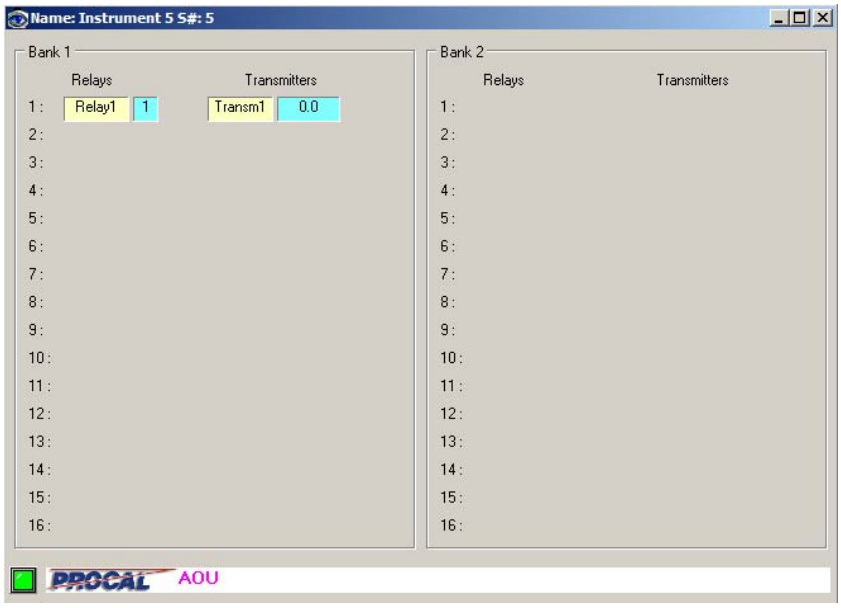
A **Data Window** for an Auxiliary Input Unit (AIU) will contain less information and will resemble the following example **Data Window**:



There will be one row of data for each channel defined for the instrument. The significance of this data is shown in the following table:

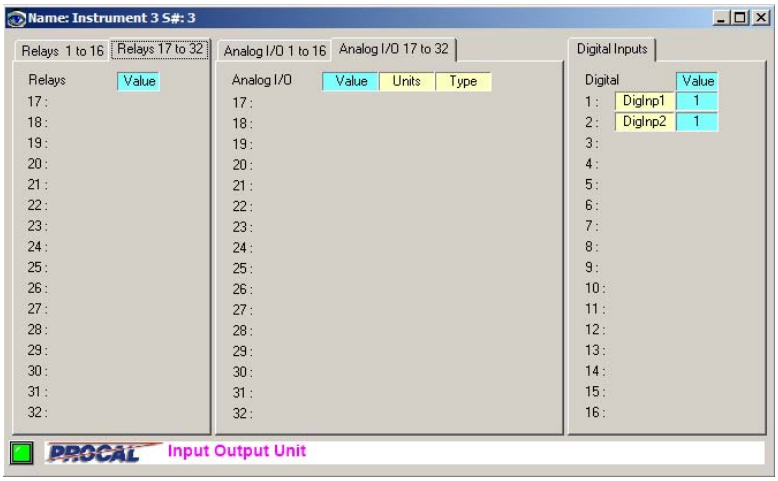
entry	*what it means*
Value	This displays the measured value for the channel.
Units	This shows the units of measurement for the channel, as defined in the Channel Info tab for the channel.

A **Data Window** for an Auxiliary Output Unit (AOU) will resemble the following example **Data Window**:



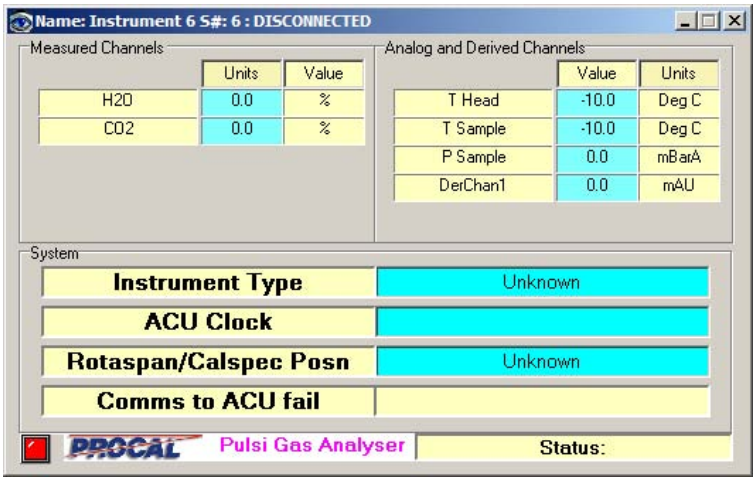
This shows readings for the two banks of relays and transmitters for the unit. The name of each item is given, followed by either the activation status (for relays) or the measured value (for transmitters).

A **Data Window** for an Input-Output Unit (IOU) will resemble the following example **Data Window**:



The tabs divide channels into their groupings. For each channel, the value is shown, and for analogue I/O channels the units and type are also displayed.

A **Data Window** for an Analyser Control Unit (ACU) will resemble the following example **Data Window**:



The significance of this data is shown in the following table:

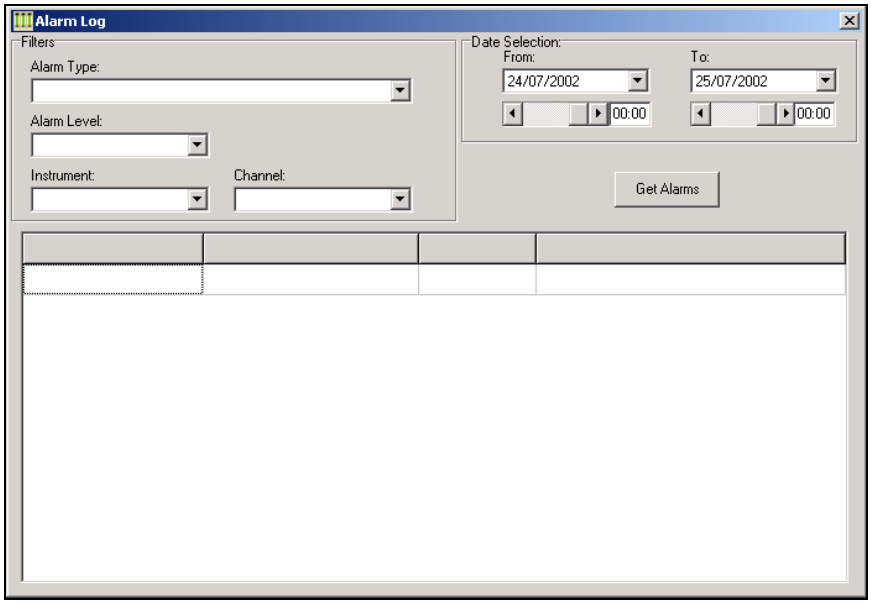
Entry	*what it means*
Measured Channels	This area shows the actual data values measured for the channels of the selected instrument. The actual channels will represent the channels defined for the instrument, but some are present by default.
H20	Measured channel reading. Calibrated or uncalibrated.
CO2	As above.
Analogue and Derived Channels	Additional Analogue and Derived channels as defined will be here.
T Head	Analyser optics/electronics Temperature
T Sample	Sample gas temperature
P Sample	Sample gas pressure.
System	ACU/ Instrument Status messages
Instrument Type	Eg P200
ACU Clock	Time on ACU.
Rotaspan/Calspec Posn	P200 Rotaspan option or P5000 Calspec. May be hidden.
Comms to ACU fail	Communications status, PC to ACU or ACU to Instrument.
Status	Instrument sample state - eg AutoZero in Progress.

Viewing alarm logs

You can view details of recorded alarms by opening the alarm log. Filters allow you to select the exact alarms and time period.

To view the alarm log:

1 Open the **Panel/Trend** window and select **Alarm Log** from the menu bar. This will display the **Alarm Log** dialog:



2 Select the required filter parameters from the **Filters** section of the dialog, as described in the following table:

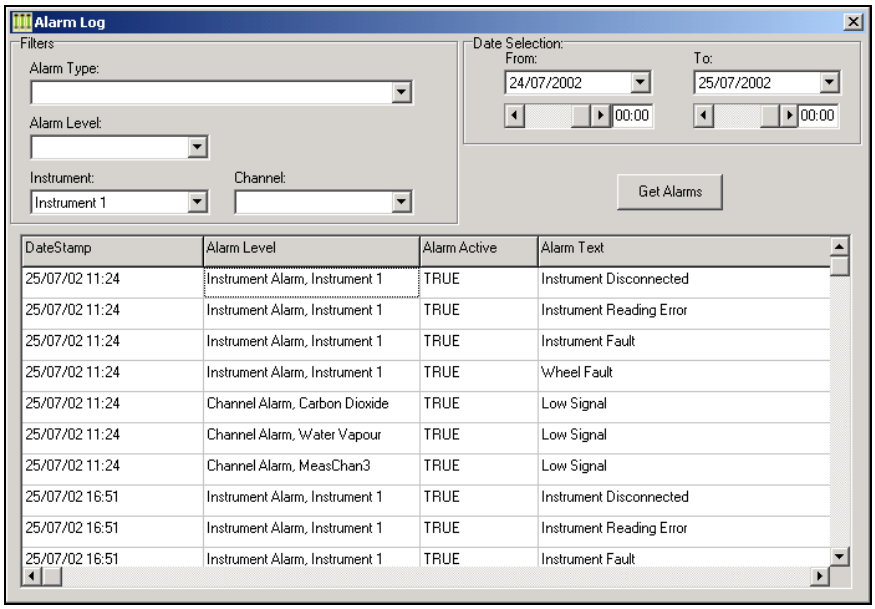
you see	*you enter or see*
Alarm Type	You can select the type of alarm you want to view from this drop-down list, which contains all the alarm types defined for the current configuration categorised by level. Leaving this field blank selects all applicable alarms.
Alarm Level	You can select the level of alarm to view, from Customer Level down to Channel Level. Leaving this field blank selects all applicable alarms.
Instrument	You can select the instrument for which you want to view alarms from this list, which includes all the instruments defined for the current system. Leaving this field blank selects all instruments and channels.
Channel	You can select the channel for which you want to view alarms from this list, which includes all the channels defined for the selected instrument. Leaving this field blank selects all channels for the instrument. Note that this field is blank if no instrument has been selected.

3 Select the time and date period for which you want to view alarms from the **Date Selection** section of the dialog, as described in the following table:

you see	*you enter or see*
From date	You can select the first date from which you want to view alarms. Clicking the arrow button at the right-hand end of the field will display a calendar from which you can select the required date. The default is yesterday's date.
From time	You either enter a start time or move the slider to select the start time from which you want to view alarms. The default is **00:00** (midnight).

you see	*you enter or see*
To date	You can select the last date to which you want to view alarms. Clicking the arrow button at the right-hand end of the field will display a calendar from which you can select the required date. The default is today.
To time	You either enter a start time or move the slider to select the finish time up to which you want to view alarms. The default is **00:00** (midnight).

4 Click the **Get Alarms** button. *ACWn* will retrieve all the alarms conforming to your selections and will display them in the bottom area of the dialog, as shown in the following example:


Alarm Log
Filters
Alarm Type:
Alarm Level:
Instrument:
Instrument 1
Channel:
Date Selection:
From:
24/07/2002
00:00
To:
25/07/2002
00:00
Get Alarms
DateStamp
Alarm Level
Alarm Active
Alarm Text
25/07/02 11:24 Instrument Alarm, Instrument 1 TRUE Instrument Disconnected
25/07/02 11:24 Instrument Alarm, Instrument 1 TRUE Instrument Reading Error
25/07/02 11:24 Instrument Alarm, Instrument 1 TRUE Instrument Fault
25/07/02 11:24 Instrument Alarm, Instrument 1 TRUE Wheel Fault
25/07/02 11:24 Channel Alarm, Carbon Dioxide TRUE Low Signal
25/07/02 11:24 Channel Alarm, Water Vapour TRUE Low Signal
25/07/02 11:24 Channel Alarm, MeasChan3 TRUE Low Signal
25/07/02 16:51 Instrument Alarm, Instrument 1 TRUE Instrument Disconnected
25/07/02 16:51 Instrument Alarm, Instrument 1 TRUE Instrument Reading Error
25/07/02 16:51 Instrument Alarm, Instrument 1 TRUE Instrument Fault

Viewing Auto calibration logs

You can view details of auto calibration procedures performed on Procal Px00 or P5000 instruments by opening the auto calibration log. You can then select a date for which you want to view records.

To view the auto calibration log:

1 Open the **Panel/Trend** window and select **AutoCal Log** from the menu bar.

2 From the displayed menu choose the instrument you want to view. This will display the **Auto Calibration Log** dialog:

3 In the **Date Selection** section you can select the last date from which you want to view alarms. Clicking the arrow button at the right-hand end of the field will display a calendar from which you can select the required date. The default is today's date.

4 Click the **Go to Date** button. Auto calibration data will be retrieved and displayed in the bottom section of the dialog, with a status code for each parameter. The codes are listed in the **Status Codes** section of the dialog.

Manually starting an AutoZero

Each optical head unit can be configured to perform an automatic autozero at user defined intervals, see *AutoZero/AutoCal* in the section *Configuring the system*. It may sometimes be necessary to override the automatic autozero and perform an immediate autozero of a head unit. This can be done achieved by *ACWn* using the **Start Autozero Now** option.

Starting an immediate autozero

To start an immediate autozero of a head, follow the numbered steps below.

1 In the **Test** screen, make the **Data Window** active for the head for which you want to start the immediate autozero. To do this either:

- Click anywhere on the appropriate **Data Window**.
- Click the appropriate selection button on the **Test** window's status/toolbar.

The **Data Window** for your selected instrument will become active.

2 Open the **Autozero** menu and select the **Start Autozero Now** option. The autozero will start on your selected instrument.

You will know that this operation has started as the status field on the **Data Window** will show **Requesting AutoZero**:

While the autozero in progress, the readings in the **Data Window** will freeze at the last 'live' value. On completion of the autozero *ACWn* will make any necessary corrections to the zero offset, and 'live' monitoring will resume.

Note: Following a manual Autozero or AutoCal change, Autozero will occur on the following conditions

- Man AZ triggered and AC scheduled within 1hr:

- If AZ interval > 1hr then reschedule AC for the end of the 1hr hold-off

- If AZ interval = 1hr then reschedule AC to coincide with the next AZ

- Man AZ triggered and AC not scheduled within 1hr or

- Man AC triggered and AC scheduled within 1hr or

- Man AC triggered and AC not scheduled within 1hr:

- Resume scheduled AZs and ACs after the 1hr hold-off

Manual air purge

During commissioning and periodic servicing it is sometimes necessary to ensure that there is no sample gas in the analyser. This is achieved by evoking a manual air purge in that head.

Starting a manual air purge

To start a manual air purge of a head:

1 Select the **Data Window** for the head in which you want to start the manual air purge. To do this either:

- Click anywhere on the appropriate **Data Window**.
- Click the appropriate selection button on the **Test** window's status/toolbar.

The **Data Window** for your selected instrument will become active.

2 Open the **Autozero** menu and select the **Manual Air Purge** option. The manual air purge will start on your selected head.

You will know this operation has been successful as the status field on the **Data Window** will read **Requesting Manual Air Purge** as the purge starts and a bullet (•) will appear alongside the menu item.

Caution
You must ensure that the manual air purge is stopped at the end of commissioning and servicing. While the manual air purge is set no valid readings can be obtained as sample gas is excluded from the optical head unit.

Stopping a manual air purge

To stop a manual air purge of an optical head unit:

1 Select the **Data Window** for the head in which you want to stop the manual air purge. To do this either:

- Click anywhere on the appropriate **Data Window**.
- Click the appropriate selection button on the **Test** window's status/toolbar.

The **Data Window** for your selected instrument will become active.

2 Open the **Autozero** menu and ensure that the **Manual Air Purge** option is marked with a bullet (•) to indicate that a manual air purge is currently running.

3 Select the **Manual Air Purge** option. The manual air purge will stop on your selected head.

You will know this operation has been successful as the status field on the **Data Window** will show **Stop Manual Air Purge** and the bullet (•) will be removed from the menu option.

Manual instrument calibration

You can perform a number of manual calibration operations from within *ACWn*. The actual calibration available depends on the particular instrument:

- For P5000 instruments you can calibrate components, analog inputs and the spectrometer.
- For Px00 instruments you can calibrate components and analog inputs.
- For auxiliary input units you can calibrate analog inputs.
- For auxiliary output units there is no calibration available.
- For input/output units you can calibrate analog inputs.
- Scatter Input/outputs for P5000.

The calibration procedures, which are all accessed through the **Test** window, are described individually.

Starting a manual calibration gas purge

Before individual component gases can be calibrate, you must first perform a gas purge to remove test gas from the OHU. You must then fill the OHU with a pure sample of the gas before calibrating the instrument.

Each PULSI optical head unit can have connection to up to two cylinders containing calibration gases. *ACWn* refers to these two calibration gases as **Gas 1** and **Gas 2**.

The following procedure assumes you are using calibration gas 1 to purge the optical head unit. If you want to use calibration gas 2 substitute **Gas 2** where ever you see **Gas 1** in the procedure.

To start a calibration gas purge of a head, follow the numbered steps below.

1 Select the **Data Window** for the head in which you want to start the gas calibration. To do this either:

- click anywhere on the appropriate **Data Window**
- click the appropriate selection button on the **Test** window's status/toolbar.

The **Data Window** for your selected instrument will become active.

2 Open the **Autozero** menu and select the **Manual Cal Gas 1** option. The calibration gas purge will start on your selected head.

You will know this operation has been successful as the status box on the **Data Window** will read **Requesting Manual Cal Gas 1** and a bullet (•) will appear alongside the menu item.

You can now calibrate the individual gases.

Manual calibration of components

During commissioning and periodic servicing it is sometimes necessary to re-calibrate the optical head unit's evaluation of some or all of the component gases. Full details on calibrating PULSI optical head units are given in their operating manuals under the heading *Field calibration checks*.

You can control the calibration process using *ACWn*. To do this, perform the following sequence of operations:

When the optical head unit is filled with the calibration gas and the readings are steady, you can calibrate that channel:

1 Perform a manual gas purge as described in *Starting a manual calibration gas purge*.

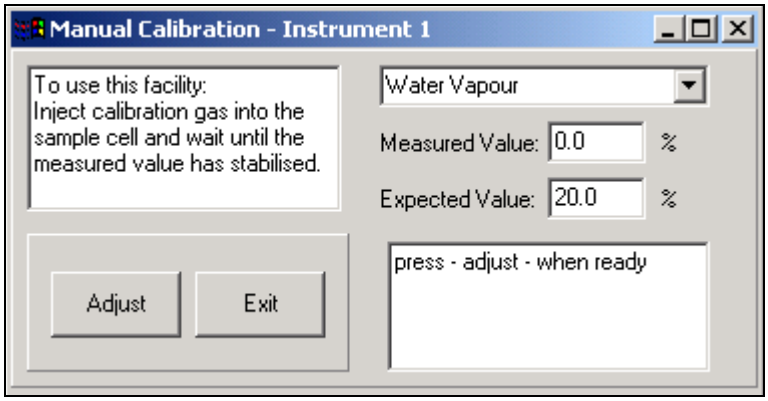
2 Select the **Data Window** for the instrument which you want to calibrate for gases. To do this either:

- Click anywhere on the appropriate **Data Window**.
- Click the appropriate selection button on the **Test** window's status/toolbar.

The **Data Window** for your selected instrument will become active.

3 Check that the status box on the **Data Window** still displays **CAL GAS 1 (or 2) ON**. If it does not, stop this procedure and follow the procedure given under the heading *Starting a manual air purge.*

4 Open the **Manual Calibration** menu and select the **Calibrate Components** option. The **Manual Calibration** dialog box will be displayed:


Manual Calibration - Instrument 1
To use this facility:
Inject calibration gas into the sample cell and wait until the measured value has stabilised.
Water Vapour
Measured Value: 0.0 %
Expected Value: 20.0 %
Adjust
Exit
press - adjust - when ready

5 Using the drop-down list, choose the component gas to be calibrated.

6 Check that the **Expected value** is set to the value shown on the gas bottle calibration certificate.

7 The current measured value for your chosen component will be displayed as the **Measured value**. When the **Measured value** stabilises, click the **Adjust** button. *ACWn* will recalibrate the component.

Note
If the ratio of measured value to expected value is less than 0.2 or greater than 1.5 then the error message **REQUIRED ADJUSTMENT TOO GREAT** will be displayed and no correction will be made. In practice the ratio should be within the range 0.95 to 1.05.

8 If you want to calibrate other gases, repeat steps 5 to 7 until all calibrations have been completed.

9 When the calibration is complete, click the **Exit** button.

Caution
You must ensure that the manual calibration gas purge is stopped at the end of calibration. While the manual calibration gas purge is set, no valid readings can be obtained as sample gas is excluded from the optical head unit.

Stopping the manual calibration gas purge

The following procedure assumes you are using calibration gas 1 to purge the optical head unit. If you used calibration gas 2 substitute **Gas 2** where ever you see **Gas 1** in the procedure.

To stop the manual calibration gas purge of an optical head unit:

1 Select the **Data Window** for the head in which you want to stop the manual calibration gas purge. To do this either:

- Click anywhere on the appropriate **Data Window**.
- Click the appropriate selection button on the **Test** window's status/toolbar.

The **Data Window** for your selected instrument will become active.

2 Open the **Autozero** menu and select the **Manual Cal Gas 1** option.. The manual calibration gas purge will stop on your selected head.

You will know this operation has been successful as the status box on the **Data Window** will show **Stop Manual Cal Gas 1** and the bullet (•) against the menu item will be removed.

Manual calibration of analogue inputs

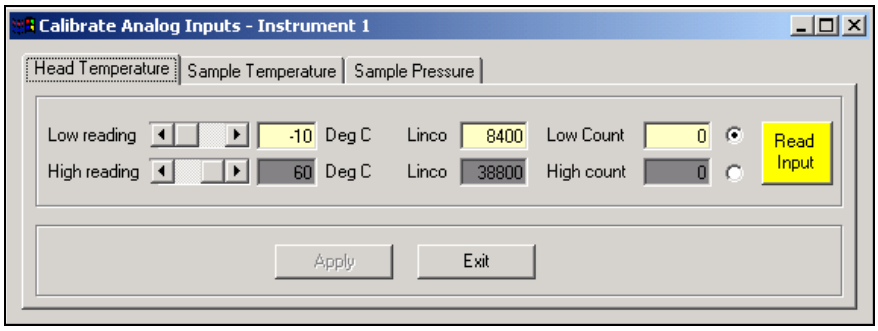
Analogue input devices can be calibrated using *ACWn.* To calibrate analogue input devices:

1 Select the **Data Window** for the head in which you want to stop the manual calibration gas purge. To do this either:

- Click anywhere on the appropriate **Data Window**.
- Click the appropriate selection button on the **Test** window's status/toolbar.

The **Data Window** for your selected instrument will become active.

2 Open the **Manual Calibration** menu and select the **Calibrate Analog Inputs** option. The **Calibrate Analog Inputs** window will be displayed:



This window consists of a series of tabbed forms, one for each analog input device (note that if there is only one device it is displayed directly in the dialog with no tabs). Each device is calibrated in the same way using a current source in the range 0 to 25 mA to simulate signals from the external source.

Calibration of the input device can be done at the zero and scan points, but greater accuracy of readings is usually achieved if the calibration is done at the 20% and 80% points of the range.

The same process is used for both low and high calibrated readings. The following procedure describes calibration of the low point:

1 Select the tab for the item to be calibrated and ensure that the option button alongside the **Low Count** box is selected.

2 Set the low reading to the required value (typically 20% of the range for the low value and 80% for high). The **Linco** (linear coefficient) reading shows the raw analogue to digital count of the current calibration value.

3 If you know the linear coefficient value to be used in the calibration, enter that value into the **Low Count** field and click the **Apply** button.

4 If you do not know the linear coefficient, connect the current source.

5 Click the **Read input** button. The reading will change to reflect the digital value being read by the ADC.

6 Repeat step 5 several times until the **Low Count** value stabilises.

Note
A count of 25 represents 0.1% of span, so a 'jitter' of this magnitude is not significant compared to the likely accuracy of the source instrument.

7 Click the **Apply** button to transfer the stabilised value into the **Linco** field.

8 Disconnect the current source.

9 Click the option button alongside the **High Count** box.

10 Set the high reading to 80% of the range.

11 Set the signal to 80% of the signal range. Connect the current source.

12 Click the **Read input** button.

13 Repeat step 12 several times until the **High Count** value stabilises.

Note
A count of 25 represents 0.1% of span, so a 'jitter' of this magnitude is not significant compared to the likely accuracy of the source instrument.

14 Click the **Apply** button to transfer the stabilised value into the **Linco** field.

15 Disconnect the current source.

16 Click **Exit**. The **Analogue Input Calibration** window will close and the count values will be stored and used in all subsequent calculations.

Manual calibration of spectrometer – P5000 only.

The stored Reference Spectra and Dark Spectra used in the P5000 Head for calculation of concentrations can be updated manually:

1 Select the P5000 head.

2 Select **Manual Calibration**.

3 Select **Calibrate Spectrometer**.

An automatic update process will take place in the P5000 head. The content of the sample cell is not relevant to this operation. See the P5000 *Operating Manual* for details.

8 Generating reports

This section describes the printed reports available in *ACWn* and how to generate them. The reports are defined and generated through the **Panel/Trends Screen**.

The following topics are covered in this section of the manual:

- Generating tabular reports.
- Printing graphical reports.
- Printing manual reports.

Generating automatic reports

Four types of tabular reports can be generated automatically by *Analyser Control for Windows*:

- Daily report.
- Weekly report.
- Monthly report.
- Autocal report (if autocalibration is enabled).

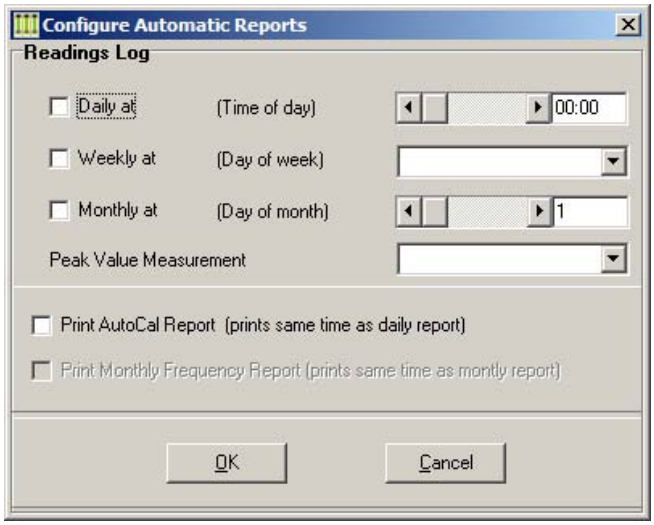
Each report reflects the data recorded by *ACWn* from a specific instrument over the given period of time.

Set up of automatic reports

Reports can be generated automatically. You can define the types of reports to be generated, and the time at which they will be generated, for any instrument or auxiliary input device.

To configure automatic reports:

1 In the **Panel/Trends Screen**, open the **Reports** menu, and select the **Select Automatic** option. The **Configure Report Printing** dialog will be displayed:



2 Select the type or types of reports you want to be generated. To do this, click on the **Daily**, **Weekly, Monthly** or **Autocal** (present only if autocalibration selected) check boxes.

3 Select a print time where indicated. This defines when the report will be generated:

- **Daily report**; enter a specific time either by typing a time directly in the selection box or using the sliding bar to select a time.
- **Weekly report**; enter a specific day of the week either by typing a day number directly in the selection box or using the drop-down list to select a day.
- **Monthly report**; enter a specific day of the month either by typing a date directly in the selection box or using the sliding bar to select a date.

4 Select the **Peak Value Measurement** interval from the drop-down list.

5 When the report configuration is complete, click on **OK.**

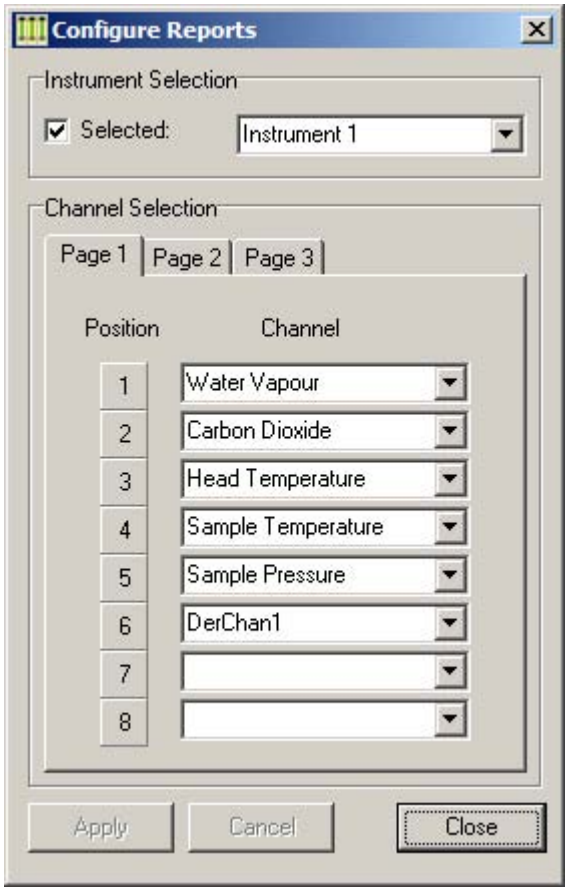
The dialog will close. Reports will be generated automatically according to the set configuration, and a separate report will be printed for each instrument. For each report type selected, *ACWn* will print a tabulated report and a graphical report describing the measurements obtained from the selected instrument during the reporting period. These will be printed on the default printer defined for the PC.

Selection of Instruments and Channels

The instruments and channels that will appear on a report can be selected or removed. You can decide which instruments and which of their channels should appear on the reports.

To Select the Instruments and Channels for Reports:

1 In the **Panel/Trends Screen**, open the **Reports** menu, and select the **Configure Reports** option. The **Configure Reports** window will be displayed:



2 Decide which Instruments appear on the Report by clicking in the tick box next to **Selected**. To confirm your selection make sure you press **Apply**.

3 To select which channels are present on the Report, click the drop down menu, then select the channel from the list or select blank to not use the channel. Make sure you click **Apply** to confirm any changes made to channel selection.

Note: Changes to the Configure Reports menu, will apply to all automatic reports as well as manual reports.

Automatic report format

The following format is used for all automatically generated tabular reports:

item	*what it means*
Header section	This shows general information about the channels defined for the instrument. Each line in this section represents one channel.
Gas	This shows the name of the channel.
Units	This displays the units defined for the channel during configuration. For more information refer to the section *Configuring the system*.

item	*what it means*
Range	This displays the value range defined for the channel during configuration. For more information refer to the section *Configuring the system*.
High limit	These are the high alarms that you can define for each channel. For more information refer to the section *Configuring the system*.
Results section	This shows the measured results for the instrument. The date and time depend on the type of report. A set of readings (one for each channel) is shown for each time.
Date	This shows the date on which the set of readings was taken.
Time	This shows the time at which the set of readings was taken.
Status	This is the status of the analyser for > 50% of the time interval that it describes. The possible categories are: *OK* — Measurement valid *OFF* — Analyser switched OFF *Analyser fault* — Analyser fault
Readings	A reading value is displayed for each channel.
Period Summary	This shows a summary of the instrument's results over the report period. The summary is broken down into results for each channel.
Average Value	This shows the average recorded value for each channel. Only valid data is included when calculating the average values that are shown in the reports. The occasions when the readings are marked as 'not valid' are: During Autozero, when the last valid measurements are logged. If there is an all-alarm 'Analyser fault'. If there is an ACU-to-OHU communications fault. If there is a PC-to-ACU communications fault. If the *ACWn* program is not running.
Peak Value	This shows the highest value (at the user selected averaging time) measured during the report period.
At Date	This shows the date on which the peak value was recorded.
At Time	This shows the time at which the peak value was recorded.
Total time > high limit	This shows the total measured time for which recordings on each channel exceeded the high limit defined for the channel.
ACWN Version	The version of program you are using currently.
Page No.	Which page you are viewing.

The following four pages show examples of the four standard tabular reports. If you want to generate tabular reports to a different format please contact either Procal Analytics Ltd. (at the address given under the heading *Further help and support*) or your local agent. We may be able to arrange additional customised report formats.

An example Daily report

The Daily report includes a table of 24 hourly averages.

Note

The items enclosed in < > are replaced by data relating to the specific customer and analyser. The details of an actual analyser have been used to make the report illustration more representative.

Master PC 194.176.65.84 Page 1 of 2

DAILY report of instrument - Stanger 1/2 (1)

For period 04 January 2003 at 00:00 to 04 January 2003 at 23:59

Gas		Units	Range	High Limit
Water Vapour	H20	%	-10.0 to 20.0	20.0
Sulphur Dioxide	SO2	ppm	0 to 1000	1000
Head Temperature	T Head	Deg C	-10.0 to 60.0	60.0
Sample Temperature	T Sample	Deg C	-10 to 360	360
Sample Pressure	P Sample	mBarA	0 to 1200	1200
Dust Measure	Dust	mA	4.0 to 20.0	-
Dust Zero	Zero	mA	4.0 to 20.0	-
Dust Span	Span	mA	4.0 to 20.0	-

Results (Report Interval 1 Hour)

Date	Time	Status	H20	SO2	T Head	T Sample	P Sample	Dust	Zero	Span
04/01/03	01:00	ON	-1.7	3	19.4	73	418	4.0	4.0	4.0
04/01/03	02:00	ON	0.2	1	18.9	73	419	4.0	4.0	4.0
04/01/03	03:00	ON	0.2	2	18.6	72	419	4.0	4.0	4.0
04/01/03	04:00	ON	0.1	4	18.3	72	419	4.0	4.0	4.0
04/01/03	05:00	ON	0.1	5	18.1	72	420	4.0	4.0	4.0
04/01/03	06:00	ON	0.2	5	17.9	72	420	4.0	4.0	4.0
04/01/03	07:00	ON	0.1	6	17.8	71	420	4.0	4.0	4.0
04/01/03	08:00	ON	0.0	6	17.6	71	421	4.0	4.0	4.0
04/01/03	09:00	ON	0.0	7	17.5	71	421	4.0	4.0	4.0
04/01/03	10:00	ON	0.1	8	17.3	71	422	4.0	4.0	4.0
04/01/03	11:00	ON	0.1	8	17.2	71	422	4.0	4.0	4.0
04/01/03	12:00	ON	0.1	9	17.2	71	422	4.0	4.0	4.0
04/01/03	13:00	ON	0.0	9	17.1	70	422	4.0	4.0	4.0
04/01/03	14:00	ON	0.0	9	17.2	70	422	4.0	4.0	4.0
04/01/03	15:00	ON	-0.1	9	17.1	70	422	4.0	4.0	4.0
04/01/03	16:00	ON	-0.1	9	17.0	70	422	4.0	4.0	4.0
04/01/03	17:00	ON	0.0	10	16.8	70	423	4.0	4.0	4.0
04/01/03	18:00	ON	0.1	11	16.7	70	423	4.0	4.0	4.0
04/01/03	19:00	ON	0.0	12	16.5	70	423	4.0	4.0	4.0
04/01/03	20:00	ON	0.0	13	16.4	70	423	4.0	4.0	4.0
04/01/03	21:00	ON	0.0	14	16.3	70	423	4.0	4.0	4.0
04/01/03	22:00	ON	0.0	15	16.2	70	424	4.0	4.0	4.0
04/01/03	23:00	ON	0.0	15	16.3	70	424	4.0	4.0	4.0
05/01/03	00:00	ON	-0.1	15	16.1	70	423	4.0	4.0	4.0

Period Summary

Average Value	0.0	9	17.3	71	422	4.0	4.0	4.0
Peak Value (average 1MIN)	0.3	25	19.8	74	425	4.0	4.0	4.0
At Date	04/01/03	04/01/03	04/01/03	04/01/03	04/01/03	04/01/03	04/01/03	04/01/03
At Time	02:00	00:01	00:01	00:10	21:25	00:01	00:01	00:01
Total time > high limit	0h00	0h00	0h00	0h00	0h00	-	-	-

ACWN version: 1.1.7 System: Master 13/01/2003 14:14:59

An example Weekly report

The Weekly report is similar to the Daily report but includes 28 periods of 6 hours over a 7 days period.

Note

The items enclosed in < > are replaced by data relating to the specific customer and analyser. The details of an actual analyser have been used to make the report illustration more representative.

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WEEKLY report of instrument - Stanger 1/2 (1)

For period 03 January 2003 at 12:00 to 10 January 2003 at 11:59

Gas		Units	Range	High Limit
Water Vapour	H20	%	-10.0 to 20.0	20.0
Sulphur Dioxide	SO2	ppm	0 to 1000	1000
Head Temperature	T Head	Deg C	-10.0 to 60.0	60.0
Sample Temperature	T Sample	Deg C	-10 to 360	360
Sample Pressure	P Sample	mBarA	0 to 1200	1200
Dust Measure	Dust	mA	4.0 to 20.0	-
Dust Zero	Zero	mA	4.0 to 20.0	-
Dust Span	Span	mA	4.0 to 20.0	-

Results (Report Interval 6 Hours)

Date	Time	Status	H20	SO2	T Head	T Sample	P Sample	Dust	Zero	Span
03/01/03	18:00	ON	5.0	57	20.7	60	340	4.0	4.0	4.0
04/01/03	00:00	ON	-10.0	104	22.4	75	417	4.0	4.0	4.0
04/01/03	06:00	ON	-0.1	3	18.5	72	419	4.0	4.0	4.0
04/01/03	12:00	ON	0.1	7	17.4	71	421	4.0	4.0	4.0
04/01/03	18:00	ON	0.0	10	17.0	70	422	4.0	4.0	4.0
05/01/03	00:00	ON	0.0	14	16.3	70	423	4.0	4.0	4.0
05/01/03	06:00	ON	0.0	1	15.7	70	423	4.0	4.0	4.0
05/01/03	12:00	ON	-0.1	3	15.4	69	423	4.0	4.0	4.0
05/01/03	18:00	ON	-0.3	1	15.9	69	422	4.0	4.0	4.0
06/01/03	00:00	ON	-0.3	3	15.5	69	422	4.0	4.0	4.0
06/01/03	06:00	ON	0.0	0	15.0	69	423	4.0	4.0	4.0
06/01/03	12:00	ON	-1.7	0	21.3	70	423	4.0	4.0	4.0
06/01/03	18:00	ON	-2.7	2	27.0	74	422	4.0	4.0	4.0
07/01/03	00:00	ON	0.1	7	21.5	75	424	4.0	4.0	4.0
07/01/03	06:00	ON	0.1	0	17.9	72	424	4.0	4.0	4.0
07/01/03	12:00	ON	15.3	656	22.6	71	423	4.0	4.0	4.0
07/01/03	18:00	ON	7.3	25	27.2	75	422	4.0	4.0	4.0
08/01/03	00:00	ON	7.5	23	22.1	75	423	4.0	4.0	4.0
08/01/03	06:00	ON	-0.8	1	17.5	72	423	4.0	4.0	4.0
08/01/03	12:00	ON	-1.3	0	22.3	71	422	4.0	4.0	4.0
08/01/03	18:00	ON	-2.0	0	26.8	75	421	4.0	4.0	4.0
09/01/03	00:00	ON	-1.2	0	21.3	75	423	4.0	4.0	4.0
09/01/03	06:00	ON	-0.2	0	17.8	72	424	4.0	4.0	4.0
09/01/03	12:00	ON	5.1	179	23.5	72	424	4.0	4.0	4.0
09/01/03	18:00	ON	19.5	547	27.7	75	423	4.0	4.0	4.0
10/01/03	00:00	ON	3.1	15	22.1	75	425	4.0	4.0	4.0
10/01/03	06:00	ON	-0.4	0	18.3	72	426	4.0	4.0	4.0
10/01/03	12:00	ON	0.6	30	23.5	72	425	4.0	4.0	4.0

Period Summary

	H20	SO2	T Head	T Sample	P Sample	Dust	Zero	Span
Average Value	1.5	60	20.4	72	420	4.0	4.0	4.0
Peak Value (average 6HOUR)	19.5	656	27.7	75	426	4.0	4.0	4.0
At Date	09/01/03	07/01/03	09/01/03	09/01/03	10/01/03	03/01/03	03/01/03	03/01/03
At Time	18:00	12:00	18:00	18:00	06:00	18:00	18:00	18:00
Total time > high limit	2h41	1h26	0h00	0h00	0h00	-	-	-

ACWN version: 1.1.7 System: Master 13/01/2003 14:37:35

An example Monthly report

The Monthly report is similar to the previous two reports but includes a month of reports on a daily basis.

Note

The items enclosed in < > are replaced by data relating to the specific customer and analyser. The details of an actual analyser have been used to make the report illustration more representative.

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MONTHLY report of instrument - Stanger 1/2 (1)

For period 20 November 2002 at 00:00 to 19 December 2002 at 23:59

Gas		Units	Range	High Limit
Water Vapour	H20	%	-10.0 to 20.0	20.0
Sulphur Dioxide	SO2	ppm	0 to 1000	1000
Head Temperature	T Head	Deg C	-10.0 to 60.0	60.0
Sample Temperature	T Sample	Deg C	-10 to 360	360
Sample Pressure	P Sample	mBarA	0 to 1200	1200
Dust Measure	Dust	mA	4.0 to 20.0	-
Dust Zero	Zero	mA	4.0 to 20.0	-
Dust Span	Span	mA	4.0 to 20.0	-

Results (Report Interval 24 Hours)

Date	Time	Status	H20	SO2	T Head	T Sample	P Sample	Dust	Zero	Span
21/11/02	00:00	ON	0.0	0	26.0	75	415	4.0	4.0	4.0
22/11/02	00:00	ON	0.0	0	27.6	76	409	4.0	4.0	4.0
23/11/02	00:00	ERROR	-	-	-	-	-	-	-	-
24/11/02	00:00	OFF	-	-	-	-	-	-	-	-
25/11/02	00:00	OFF	-	-	-	-	-	-	-	-
26/11/02	00:00	ON	0.2	1	29.1	77	413	4.0	4.0	4.0
27/11/02	00:00	ON	-0.6	1	26.3	76	418	4.0	4.0	4.0
28/11/02	00:00	ON	-1.3	0	24.7	75	418	4.0	4.0	4.0
29/11/02	00:00	ON	-1.3	0	28.3	77	414	4.0	4.0	4.0
30/11/02	00:00	ON	-1.6	2	25.8	75	418	4.0	4.0	4.0
01/12/02	00:00	ON	-1.4	2	23.9	74	421	4.0	4.0	4.0
02/12/02	00:00	ON	-1.3	2	23.6	74	414	4.0	4.0	4.0
03/12/02	00:00	ON	-1.1	0	25.6	75	412	4.0	4.0	4.0
04/12/02	00:00	ON	-1.6	2	26.9	76	417	4.0	4.0	4.0
05/12/02	00:00	ON	-1.4	1	26.4	76	417	4.0	4.0	4.0
06/12/02	00:00	ON	-2.5	1	25.6	75	423	4.0	4.0	4.0
07/12/02	00:00	ON	6.1	384	26.1	75	426	4.0	4.0	4.0
08/12/02	00:00	ON	-10.0	569	22.8	74	425	4.0	4.0	4.0
09/12/02	00:00	ON	-10.0	569	21.2	73	425	4.0	4.0	4.0
10/12/02	00:00	ON	-1.0	492	25.2	74	424	4.0	4.0	4.0
11/12/02	00:00	ON	-1.0	27	27.5	74	423	4.0	4.0	4.0
12/12/02	00:00	ERROR	-	-	-	-	-	-	-	-
13/12/02	00:00	OFF	-	-	-	-	-	-	-	-
14/12/02	00:00	OFF	-	-	-	-	-	-	-	-
15/12/02	00:00	OFF	-	-	-	-	-	-	-	-
16/12/02	00:00	OFF	-	-	-	-	-	-	-	-
17/12/02	00:00	ON	-1.7	0	32.7	230	677	9.2	9.1	9.0
18/12/02	00:00	ON	0.0	0	0.0	0	0	0.0	0.0	0.0
19/12/02	00:00	OFF	-	-	-	-	-	-	-	-
20/12/02	00:00	OFF	-	-	-	-	-	-	-	-

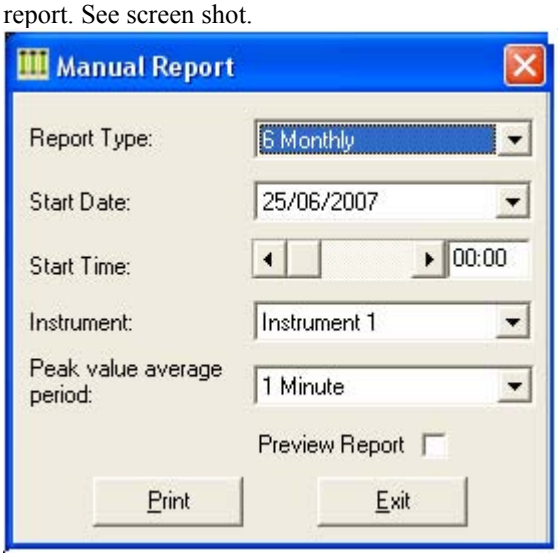
Period Summary

Average Value	-1.6	103	24.8	79	411	4.1	4.1	4.1
Peak Value (average 1HOUR)	64.7	2288	32.7	230	677	24.0	24.0	122.0
At Date	28/11/02	06/12/02	11/12/02	11/12/02	11/12/02	20/11/02	20/11/02	22/11/02
At Time	12:00	09:00	17:00	17:00	17:00	11:00	12:00	00:00
Total time > high limit	5h00	3h02	0h00	0h00	0h00	-	-	-

ACWN version: 1.1.7 System: Master 13/01/2003 14:42:52

Six Monthly Reports

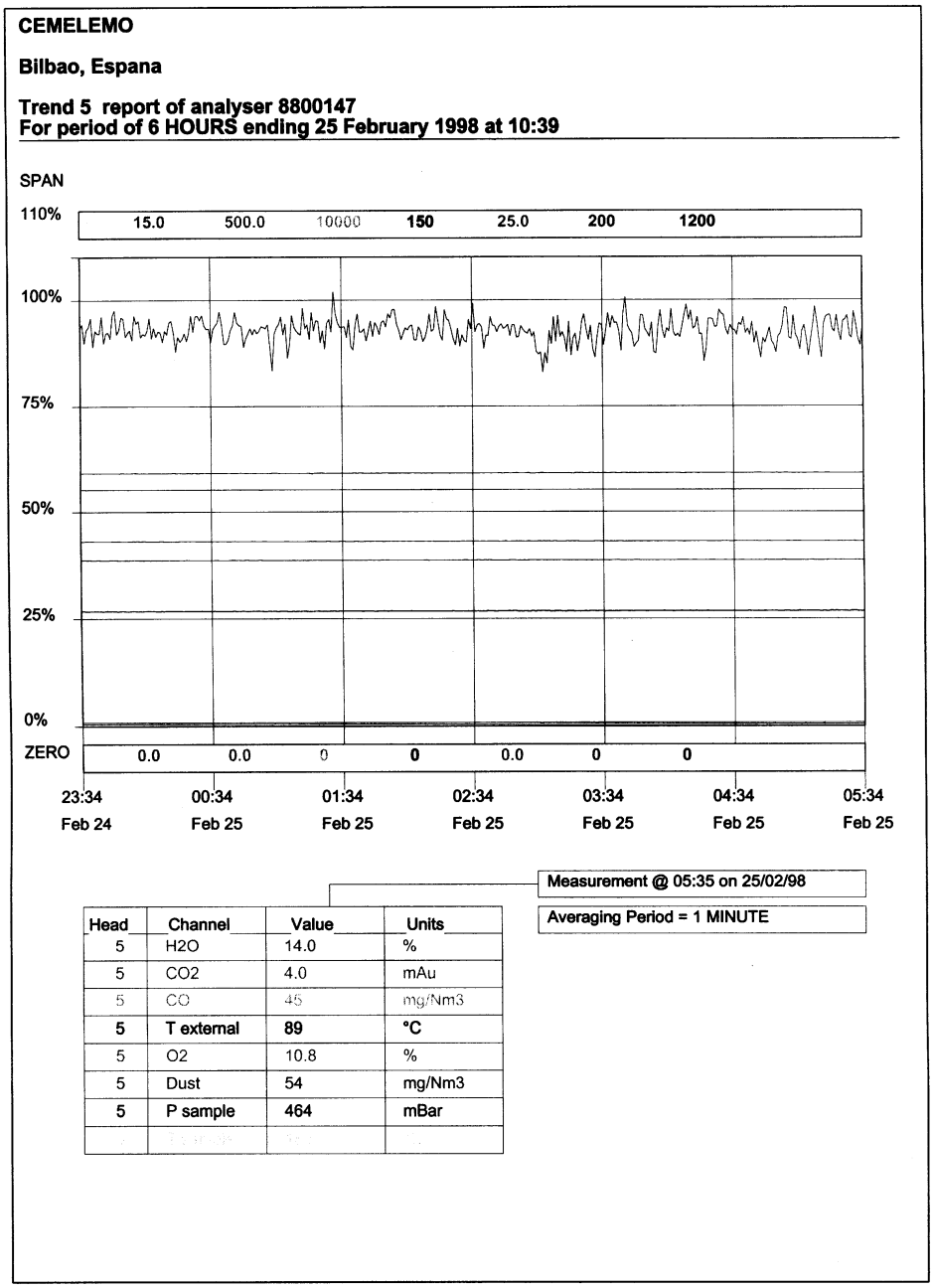
To create a six monthly report select reports on the panel trend screen, then select print manual report. See screen shot.



To preview select the preview report tick box.

Printing graphical reports

A graphical report is a print of a Trend chart, which reflects the information visible on the **Trend** window and will typically look as follows:



To print a graphical report of a **Trend** chart, display the chart and click the Print button.

Layout of Autocal Report

The Autocal report includes a table of calibration results from the 7 day Log.

Note
The items enclosed in < > are replaced by data relating to the specific customer, analyser and results as in the Autocal Log, see *Instruments with autocalibration*.

Master Printed: 14/01/03 at 11:21

AutoCal report for Stanger 1/2 (1)
For period ending 14 January 2003 at 00:00

13-01-03 at 16:12	SO_2	CO_2
	ppm	%
Gas cyl #	1	1
Zero conc	1	0.1
Zero error(%)	0.1	0.4
Gas cyl conc	852	28.0
Span conc	873	30.7
Span error (%)	2.1	2.3
Status	OK	OK

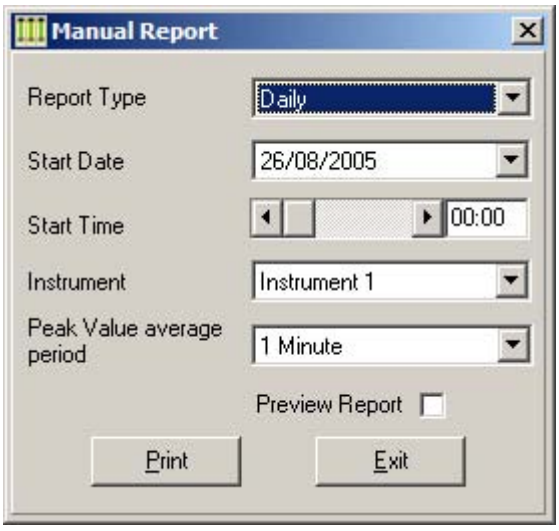
13-01-03 at 00:00	SO_2	CO_2
	ppm	%
Gas cyl #	1	1
Zero conc	1	0.1
Zero error(%)	0.1	0.4
Gas cyl conc	852	28.0
Span conc	811	26.5
Span error (%)	-4.1	3.6
Status	Cal Corrected	Cal Corrected

Printing manual reports

If a copy of a previously printed report is required, or if you want to create a report for a specified period, it can be reprinted by *ACWn*. You can print Daily, Weekly and Monthly reports for a specific instrument, and you can choose a particular start time for the report.

Note
The menu options needed to reprint reports, will not become available until you have started using *Analyser Control for Windows* to monitor and record data, **and** have already produced printed reports.

1 From the **Panel/Trends Screen** open the **Reports** menu and select the **Print Manual Report** option. This will display the **Manual Report** dialog:



2 Select the type of report (**Daily**, **Weekly, Monthly or 6 Monthly**) from the **Report Type** list.

3 Enter a date for the report. You can either type the date directly into the field or click the arrow button at the right-hand end of the field to choose from a calendar.

4 Enter a start time for the report. You can either type a time directly into the field or use the slider to adjust the time. This field is not available for Monthly reports.

5 Select the **Instrument** for the report. This list contains all the instruments defined for the current system.

6 Select the **Peak value average period** from the drop-down list.

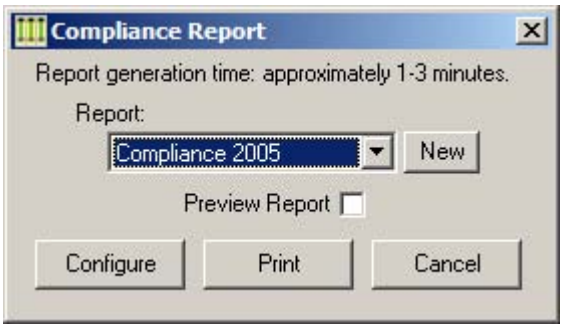
7 If you want to see a preview of the report on screen, select the **Preview Report** checkbox.

8 Click the **Print** button to print the report. If you have selected the **Preview Report** checkbox, the report will be shown on screen; you can scroll through the preview, zoom and print the report from the preview. If you have not selected **Preview Report**, the report will be printed on your default system printer.

Compliance reports

The compliance reports can be found in the **Panel/Trend Screen Reports** menu under **Print Compliance Reports**.

Creating a new compliance report



To create a new report, click on the **New** button. This will bring up a **New Report** dialog:

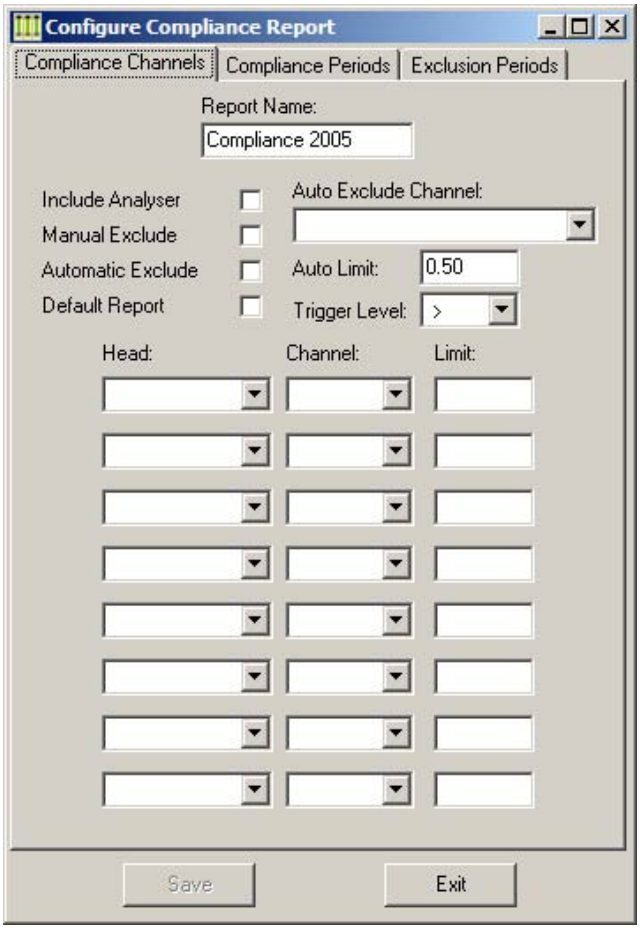
This window allows the name of the report to be entered. The combo box below allows a report to be entered, which will be used as the basis for the channels of the new report i.e. the new report will contain the channels reported in the selected report, mainly used to avoid re-entering channels previously entered on a different report.

If **OK** is clicked then the configuration window for this report is displayed.

Configuring a report

This window is displayed when a new report is created or the configure button on the compliance report window is pressed. Once the configuration is changed then the save button will become enabled, so changes can be saved. The exit button closes the window.

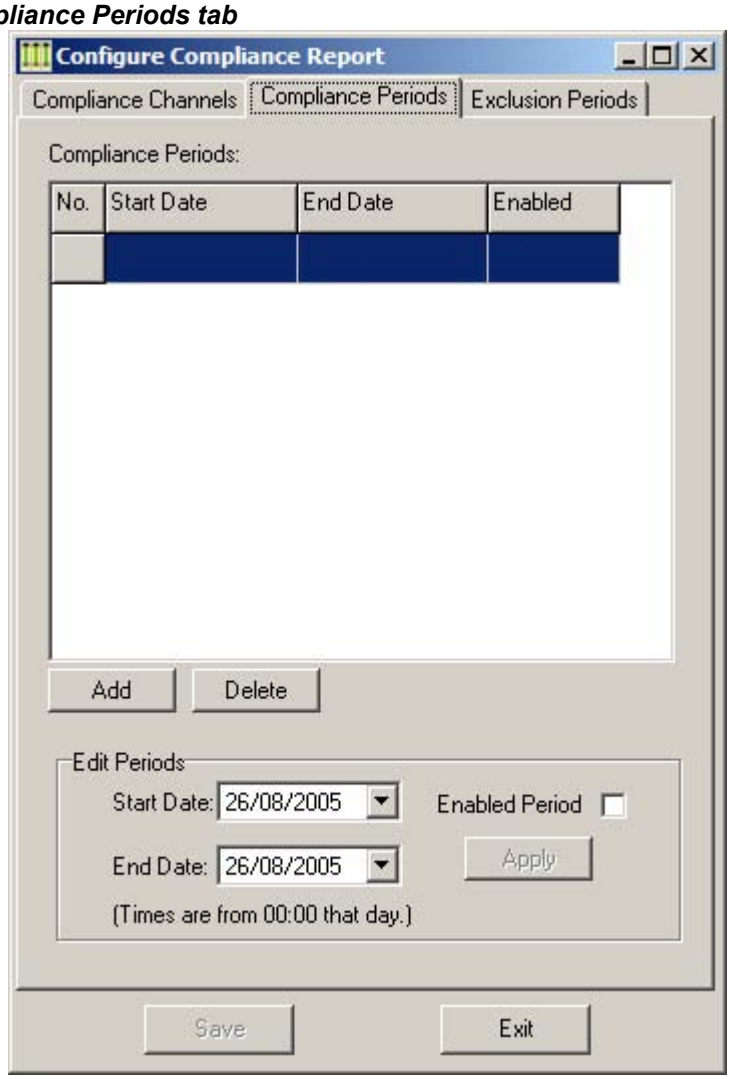
Compliance Channels tab



You can enter the following report parameters:

- **Include analyser**. Selects whether the analyser row, availability of the head, is included into the report.
- **Manual exclude**. Selects whether manual exclusions are included when calculating and printing report.
- **Automatic exclude**. Selects whether automatic exclusions are included when calculating and printing report.
- **Default report**. When selected the report becomes the default report selected in the compliance report window.
- **Auto Exclude Channel**. This list gives all the available channels. If the automatic exclude checkbox is selected, then an automatic exclude channel needs to be selected.
- **Auto Limit**. This is the automatic exclude limit value.
- **Trigger Level**. This trigger value allows the trigger of the automatic exclude channel value to be “>” greater than, “<” less than or “=” equal to trigger limit.
- **Head**. This list allows a head to be selected.
- **Channel**. This list displays the channels of the head selected in the **Head** list.
- **Limit**. This edit box is the limit for the channel selected in the channel combo box.

Compliance Periods tab

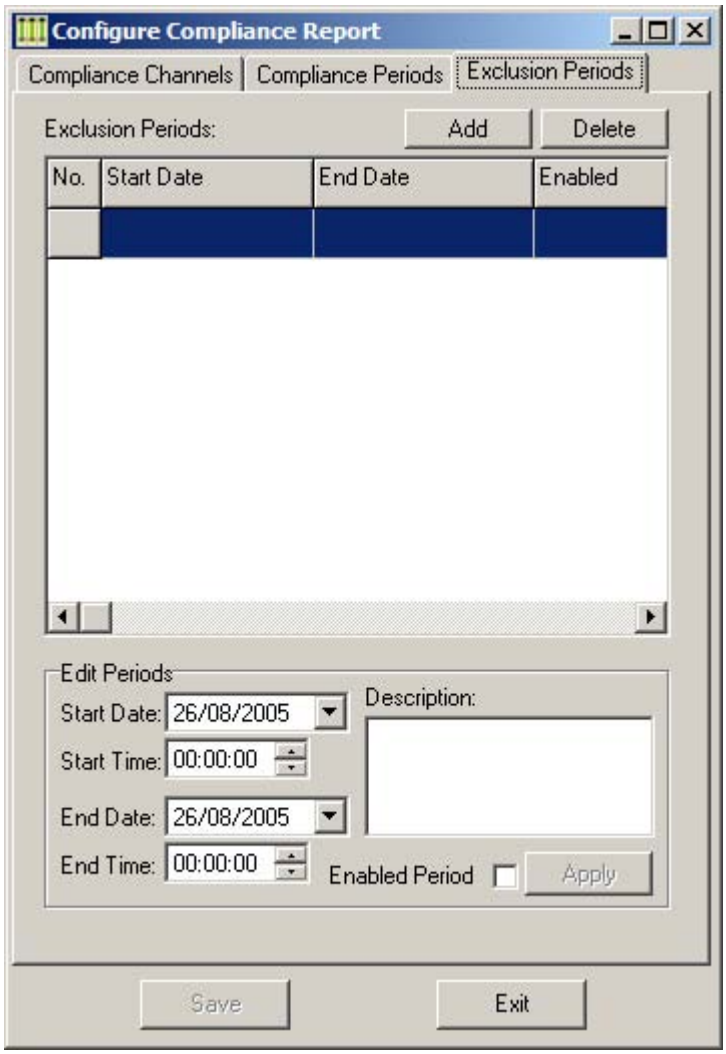


This tab contains the following features:

- **Compliance periods grid**. This shows all the compliance period for this system. The periods that have enabled set equal to true are the ones selected for this report. Selecting a row will put its details into the Edit periods boxes. Only 12 periods can be enabled for a report at a time.
- **Add**. This button adds a new enabled period to the grid. It defaults to the start date being the 1st of the month following the last period and the end date is the 1st of the next month.
- **Delete**. This button deletes the selected period from the grid.
- **Start Date**. This allows the start date of the selected period to be changed.
- **End Date**. This allows the end date of the selected period to be changed.
- **Enable Period**. shows whether the selected period is enabled for current report.
- **Apply**. This button applies any changes made to the selected period.

Exclusion Periods tab

If the manual exclusion check box on the compliance channels tab is checked then these are the manual exclusion periods that will be used. They apply to all the reports. When an exclusion period is selected its details are shown in the **Edit Periods** panel:

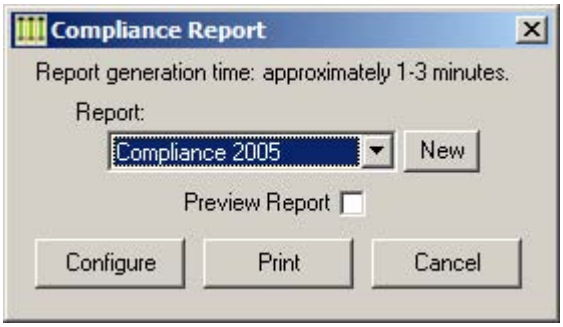


This tab contains the following features:

- **Add**. This button adds a new period with default start and end dates of midnight of the current date to midnight of the next day.
- **Delete**. This button removes the selected exclusion period.
- **Start Date**. Allows the start date to be changed.
- **Start Time**. Allows the start time to be changed.
- **End Date**. Allows the end date to be changed.
- **End Time**. Allows the end time to be changed.
- **Description**. Enter a description to help explain the exclusion.
- **Apply**. Applies the changes made to the selected period to the grid.

Printing a compliance report

Printing of the report is done from the **Compliance Report** window:



The **Report** list holds all the reports for the current system. Select the one that is to be printed. The **Preview Report** checkbox allows you to display a preview window that can be used for printing. When previewing the report is shown in two distinct previews:

- Channel value.
- Exclusion periods.

Click the **Print** button to preview or print the report. Following this the compliance report window will close and the report will be generated. This can take a while depending mainly on the length and number of periods. Most reports covering less than three months will be printed within a minute.

Calculations:

All calculations are done on the 15min averages of the channel readings.

The Channel Average = (sum of 15 min readings) / count of 15 min readings

(Excluding when instrument is OFF and exclusions)

Channel Compliance = 100 – (100 * (count of 15 mins > compliance limit)/count)

(Excluding when instrument is OFF and exclusions)

Analyser availability = 100 – (100 * (count of 15mins with analyser off)/count))

(Exclusions are not used in this calculation)

Formatting:

The channel averages on the report are formatted using the channel formatting. Compliance and analyser availability percentages have one decimal place.

Page intentionally blank.

9 Instruments with autocalibration

To satisfy the environmental regulations in the USA and some other countries, it is necessary both to check and to demonstrate that the analyser is within its quoted calibration accuracy. This requires that the Autozero facility should be augmented by an automatic check of the span calibration of the analyser.

Once a day the analyser zero and span accuracy must be checked and recorded. This record is maintained on a rolling seven day basis, and the record for the previous seven days must be available for viewing and printing at any time on demand.

This section describes the automatic calibration functions of the Procal P200LR and P400, which are designed to meet the requirements of US EPA 40 CFR Part 75. It must be read in conjunction with the appropriate OHU Operating Manual.

Services required

The following services are required for this option:

ZERO GAS — Clean, dry instrument air at a continuous 0.5 litre/min for the analyser void flush and 5 litres/min for approximately 4 minutes every autozero cycle. The use of instrument air meets the EPA requirement that the zero gas concentration should be between 0 and 20% of full scale of the measured gases.

SPAN GAS — This should be a gas, or gas mixture containing all the gases for which verification is required. The concentration of each gas should be between 80% and 100% of the full scale sensitivity of its measured channel. Consumption is 5 litres/min for approximately four minutes every 24 hours. NO, CO, SO_2 etc. should be mixed with N_2. NO_2 should be mixed with pure air. The span gas concentration (from the certificate) must be entered in the **AutoZero Configure** tab for the channel each time a new gas bottle is installed. For US EPA compliance purposes it should be EPA Protocol 1, calibration gas, vendor certificated.

Hardware required

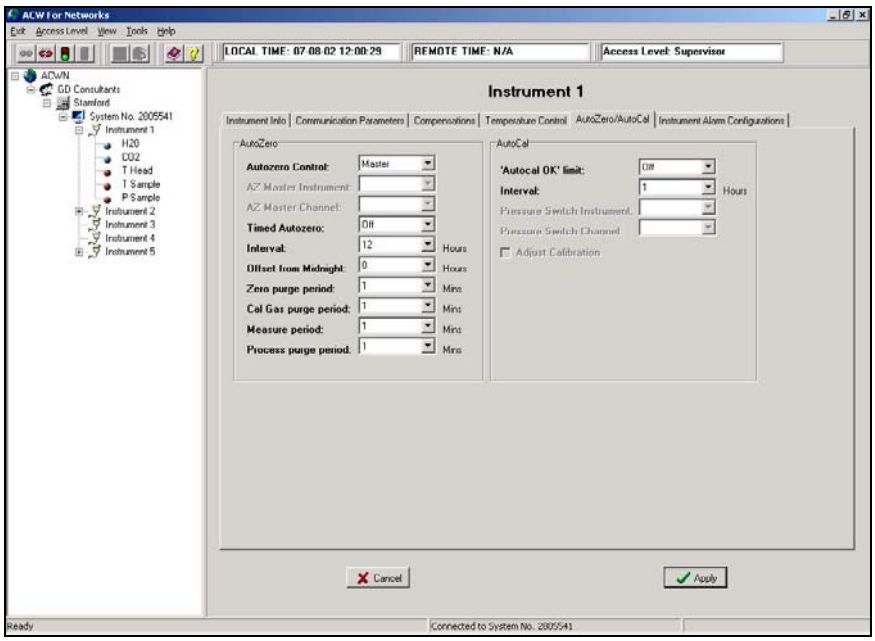
For Autocalibration to work, a Procal Autoverification Unit (Procal part number 1-1400) must be fitted adjacent to the OHU to which it will provide gas.

Instrument configuration

Before you can request autocalibration you must enable the Autocalibration facility on the *ACWn*. Firstly, it is necessary to gain Engineer or Supervisor level access as described under the heading *Changing the access level*:

In the left-hand pane of the **Overview** window, select the instrument to be calibrated.

1 In the right-hand pane select the **AutoZero/AutoCal** tab to display the following:



2 In the **'Autocal OK' limit** field select either **5%** or **10%** from the drop-down list. This selection determines the action to be taken if an instrument is found to be out of calibration:

- If you select **5%**, then an error in the range 0 to 2.5% results in no action, errors of 2.5% to 5% will be corrected and errors over 5% will give an out of range error.
- If you select **10%**, then an error in the range 0 to 5% results in no action, errors of 5% to 10% will be corrected and errors over 10% will give an out of range error.

3 Select the time interval at which autocalibration is be performed.

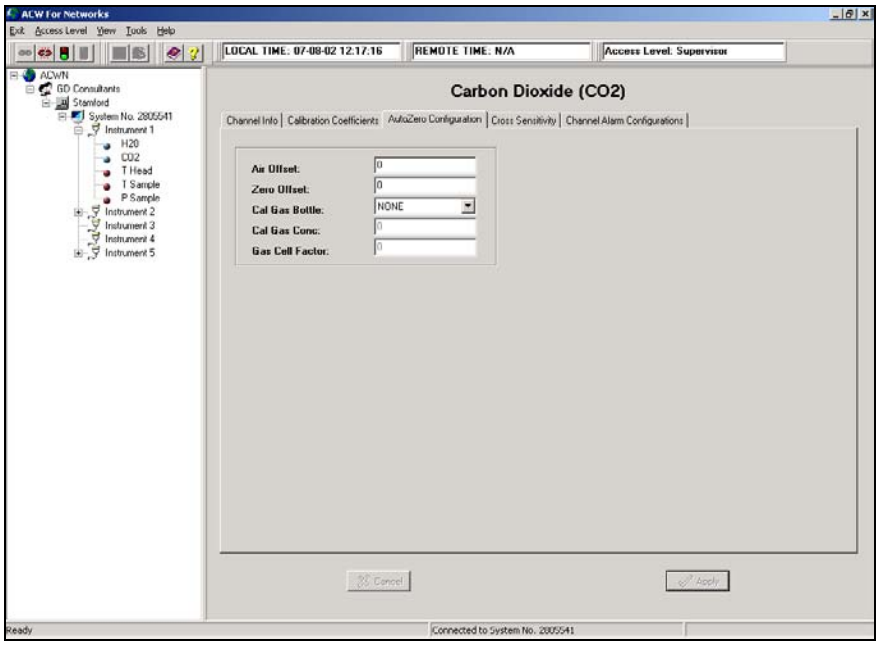
4 Click the **Apply** button.

Channel configuration

When you have enabled autocalibration for the instrument you can set up the channel parameters for each applicable channel:

1 In the left-hand pane of the **Overview** window, select the required channel.

2 In the right-hand pane of the **Overview** window select the **AutoZero Configuration** tab:



3 Select the gas bottle to be used for the calibration. The calibration gases may be mixed in either one or two cylinders. The latter case allows for gases that do not form stable mixtures.

4 Enter the concentration of the calibration gas (between 80% and 100% is recommended) and the **Gas Cell Factor**, then click **Apply**.

Starting autocalibration

Autocalibration is started from the **Test** window. Select the required instrument on the status bar and select **Start AutoCal Now** from the **AutoZero** menu. The autocalibration will then run as described under the heading *Operation* for all the channels that have been configured.

Note
If you want to run autocalibration on more than one instrument, you must start the process for each instrument in turn.

Operation

At the first Autozero after midnight, the Autozero cycle will be augmented to include a calibration routine. In the following table this is phases 5 to 7 inclusive for Calibration cylinder 1, and 8 to 11 inclusive for Calibration cylinder 2. In addition, this data will be recorded, once per day at this time, for 7 days. This data can be inspected and printed as described in *Viewing the results*.

During calibration, the introduction of the gases causes the pressure in the cell to increase slightly. To allow for variations in ambient pressure, in process pressure and in the gas pressure during auto calibration, a transducer in the analyser is used to provide continuous pressure compensation. In addition, to ensure that calibration gas is present, the calibration gas cylinder pressure can be, optionally, sensed by a pressure switch (set to operate at 100 psi) integral with its regulator. The contacts of this switch are sensed in the OHU and an error is reported if the gas pressure is low.

A further function is provided for the remote start of an Autozero cycle which overrides the internal automatic timer. If fitted, this facility is activated by shorting 2 inputs on the Optical Head Unit pcb with an external volt-free contact (see the heading *OHU electrical connections* later in this section).

The following table shows the phases of the calibration cycle, their default timings and the states of the gas solenoids during the automatic calibration:

Phase	***Name***	***Function***	***Default Duration (hh:mm:ss)***	***Zero Gas***	***Span Gas 1***	***Span Gas 2***	***Span Gas 3***
1	ANALYSE	Normal analyser operation	12:00:00	1	0	0	0
2	ZERO FLUSH	Introduce zero gas, thereby purging the sample gas.	00:03:00	0	0	0	0
3	ZERO MEASURE	Average the readings	00:02:00	0	0	0	0
4	ZERO UPDATE	Log the concentration reading and reset the zero level.	00:00:01	0	0	0	0
5	SPAN 1 FLUSH	Introduce span gas, thereby purging the zero gas	00:03:00	1	1	0	0
6	SPAN 1MEASURE	Average the readings	00:02:00	1	1	0	0
7	SPAN 1 UPDATE	Log the concentration reading and act upon the error	00:00:01	1	1	0	0

Phase	Name	Function	Default Duration (hh:mm:ss)	Zero Gas	Span Gas 1	Span Gas 2	Span Gas 3
		according to the procedures below.					
8	SPAN 2 FLUSH	Introduce span gas, thereby purging the zero gas	00:03:00	1	0	1	0
9	SPAN 2 MEASURE	Average the readings	00:02:00	1	0	1	0
10	SPAN 2 UPDATE	Log the concentration reading and act upon the error according to the procedures below.	00:00:01	1	0	1	0
11	SPAN 3 FLUSH	Introduce span gas, thereby purging the zero gas	00:03:00	1	0	0	1
12	SPAN 3 MEASURE	Average the readings	00:02:00	1	0	0	1
13	SPAN 3 UPDATE	Log the concentration reading and act upon the error according to the procedures below.	00:00:01	1	0	0	1
14	LIVE FLUSH	Switch off span gas thereby allowing the sample gas to re-enter the cell.	00:03:00	1	0	0	0

(1 = energised, 0 = de-energised)

Note that if SPAN GAS 3,2,1 are not selected the 11 to 13, 8 to 10, 5 to 7 respectively omitted.

Note that the Zero gas solenoid valve is energised-closed so that in the event of a power failure the valve opens, flooding the sample cell with dry air and excluding low temperature sample gas that could cause acidic condensation and hence corrosion.

Action on calibration assessment

At calibration, the action taken automatically depends on the magnitude of the error:

- If the error is less than 2.5% (or 5% for higher limit) of full scale, no action is required as the calibration is within specification.
- For a change in calibration of between 2.5% and 5% (or 5% to 10%) of full scale, the analyser calibration is automatically adjusted to give the correct reading and the calibration is OK; this function is enabled in SERVICE MENU - AUTOCAL MENU.
- If the error is greater than 5% (or 10%) or if the gas cylinder pressure falls below 100 psi, the analyser is considered to be out of calibration; no re-calibration action is taken and ERROR is shown against that gas in the ALARM screen under the heading CAL.

  In addition, the word ERROR appears on the ALARM screen under the heading **Cal .**

Viewing the results

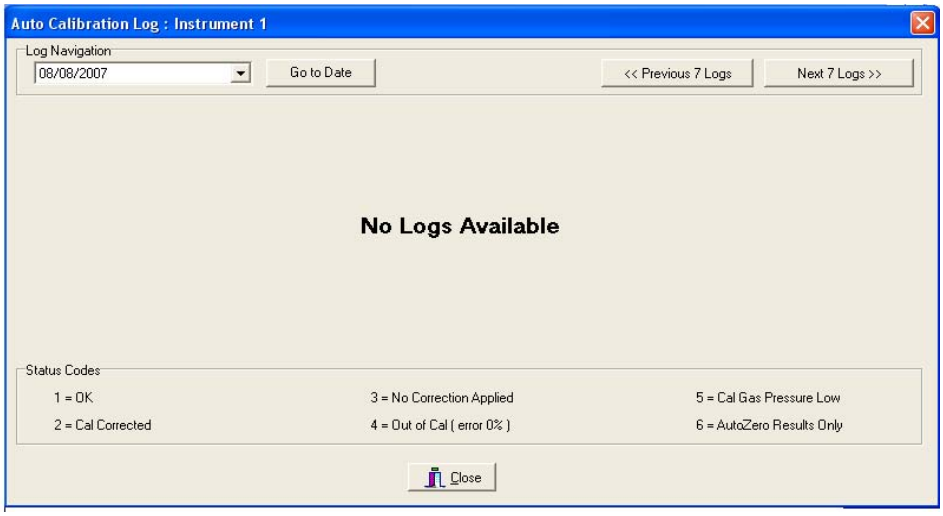
You can view autocalibration results on screen, and also print reports either on demand or on a daily basis.

Viewing results on screen

Autocalibration results are held in a log within *ACWn*. To view the autocalibration log:

1 Open the **Panel/Trend** window and select **AutoCal Log** from the menu bar.

2 From the displayed menu choose the instrument you want to view. This will display the **Auto Calibration Log** dialog:



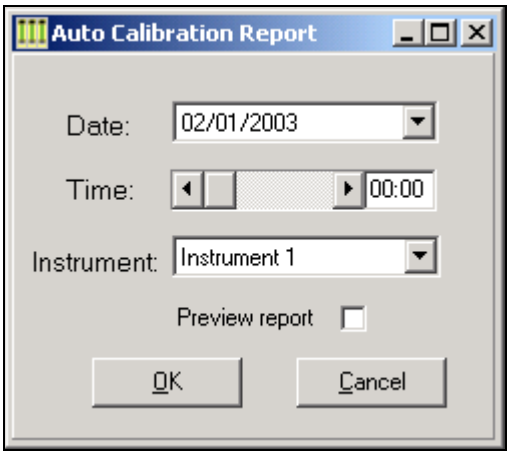
3 In the **Date Selection** section you can select the last date from which you want to view alarms. Clicking the arrow button at the right-hand end of the field will display a calendar from which you can select the required date. The default is today's date.

4 Click the **Go to Date** button. Autocalibration data will be retrieved and displayed in the bottom section of the dialog, with a status code for each parameter. The codes are listed in the **Status Codes** section of the dialog.

Printing results on demand

You can print selected content from the autocalibration log is a report at any time:

1 Open the **Panel/Trend** window and select **Print AutoCal** from the **Reports** menu. This will display the **Auto Calibration Report** dialog:



2 Enter date and time details for the report and select the instrument.

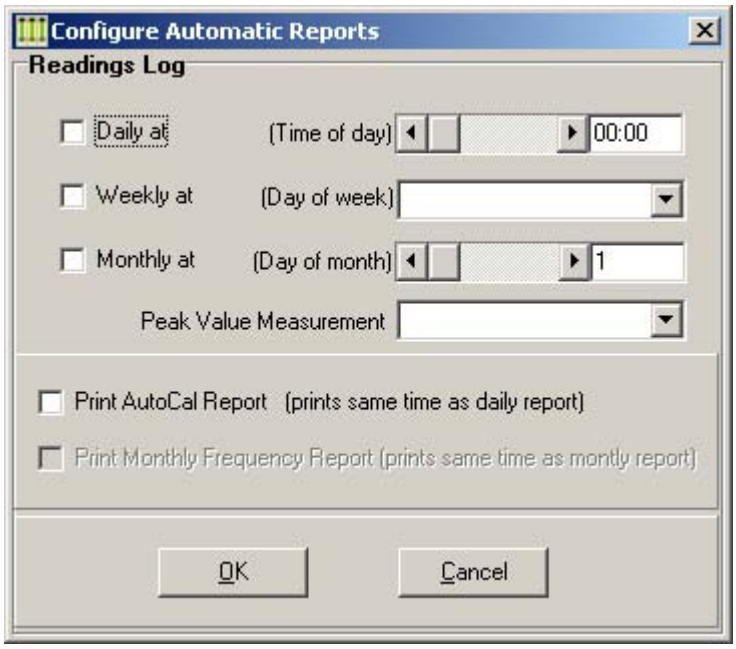
3 If you want to see a preview of the report on screen, select the **Preview Report** checkbox.

4 Click the **OK** button to print the report. If you have selected the **Preview Report** checkbox, the report will be shown on screen; you can scroll through the preview, zoom and print the report from the preview. If you have not selected **Preview Report**, the report will be printed on your default system printer.

Printing results on a daily basis

You can configure *ACWn* to print the content of the autocalibration log on a daily basis:

1 Open the **Panel/Trend** window and choose **Select Automatic** from the **Reports** menu. This will display the **Configure Automatic Reports** dialog:



2 Select **Print AutoCal Report** and click **OK**. The report will then be printed daily.

OHU electrical connections

On the OHU CPU pcb there are 2 external interface connectors: TS1, which is a 16-way 2-part screw connection terminal strip, and on the OHU transition board TS2 which is a 6-way terminal strip and TS3 which is an 8-way terminal strip.

TS2 is the connector used for analogue inputs, TS3 for outputs. Connections to TS2 should be made using individual bootlace crimped wires of a multicore round cable.

All the connections in the OHU are routed either to the ACU or the ALU. All the customer connections are made in the ALU, none being made to the OHU.

The electrical connections are detailed in the following table (see also drawing number 7-2055 and 7-2099):

OHU connection	*To*	*Function*
TS1-1	ACU TS3-1	Data return B
TS1-2	ACU TS3-2	Data return A
TS1-3	ACU TS3-3	Data Out B
TS1-4	ACU TS3-4	Data Out A
TS1-5	ACU TS3-5	DC +24 V
TS1-6	ACU TS3-6	DC 0 V

OHU connection	*To*	*Function*
TS1-7	To next OHU	DC return B
TS1-8	To next OHU	DC return A
TS1-9	To next OHU	Data Out B
TS1-10	To next OHU	Data Out A
TS1-11	To next OHU	DC +24 V
TS1-12	To next OHU	DC 0 V
TS1-13	ALU terminal 7	DC +24 V
TS1-14	ALU terminal 10	A/Z solenoid
TS1-15	ALU terminal 8	Heater SSR (not used)
TS1-16	ALU terminal 13	A/V solenoid
TS2 – 1	PRESSURE SENSOR	)See 7-2099-00
TS2-2	I/P2	)
TS2-3	I/P3	)
TS2-4	I/P4	)
TS2-5	0V	)
TS2-6	0V	)

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10 Using *ACWn* over a network

ACWn can be used over a network to enable remote monitoring and control using:

- Direct connection.
- Local Area Network (LAN) connection.
- Dial-up connection.

The master PC, which is connected directly to the OHU, can be connected to any number of remote systems. Any of these remote systems can then access the data from the master system.

Setting up remote operation

The procedure within *ACWn* is identical in each case, but the Windows set-up may vary. You can configure the remote PC to access any system on the master PC. The system must be active on the master PC before remote access can be achieved.

1. Make the appropriate connection between the computers and use standard Windows techniques to configure the connection.
2. Start *ACWn* on the remote PC.
3. Create a new system on the remote PC with the same number as the system on the master PC.
4. Select the new system on the remote PC.
5. Select the **System Info** tab, and select **Remote Access** from the **ACWn Mode** drop-down list.
6. Enter the IP address of the master PC into the **Remote IP Address** field. If you do not have this address, contact your network administrator.
7. From the **Connection** list select the appropriate connection method.
8. Click the **Apply** button to implement the connection.
9. Select the **System Status** tab and click the **Connect** button. When the connection has been made, the status will change to show **CONNECTED**.

Using *ACWn* from a remote PC

On connection, the **Status** field will show **RUNNING**.

Once the system has been configured, connected and started, the remote PC has all the same features as the master PC. System operation is identical to a standalone *ACWn* system.

Access level control

Although the master system can be monitored by any number of users with Operator level access, only one user at any time can have access at any higher level. If you log on as a Supervisor, any other user currently logged on at Supervisor level will have access downgraded to Operator level.

If any user has Engineer level access, only Operator access can be achieved on any other system.

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